Case No. 16-2018

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

SKKY, INC.,

Appellant

v.

MINDGEEK, S.A.R.L., MINDGEEK USA, INC., PLAYBOY ENTERPRISES INTERNATIONAL, INC.,

Appellees

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in IPR2014-01236, Administrative Patent Judges Howard B. Blankenship, Kristen L. Droesch, and Robert J. Weinschenk.

APPELLANT SKKY, INC.'S CORRECTED OPENING BRIEF

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August 8, 2016
[Corrected August 9, 2016]

FORM 9. Certificate of Interest

Form 9
Rev. 03/16

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

Skky, Inc. v. Mindgeek, s.a.r.l

Case No. 16-2018

CERTIFICATE OF INTEREST

Counsel for the:
☐ (petitioner) ☒ (appellant) ☐ (respondent) ☐ (appellee) ☐ (amicus) ☐ (name of party)

certifies the following (use "None" if applicable; use extra sheets if necessary):

1. Full Name of Party Represented by me	2. Name of Real Party in interest (Please only include any real party in interest NOT identified in Question 3) represented by me is:	3. Parent corporations and publicly held companies that own 10 % or more of stock in the party
Skky, Inc.	Skky, LLC	None

4. The names of all law firms and the partners or associates that appeared for the party or amicus now represented by me in the trial court or agency or are expected to appear in this court (and who have not or will not enter an appearance in this case) are:

None

Aug 8, 2016
Date

/s/ Andrew J. Kabat
Signature of counsel

Please Note: All questions must be answered

Andrew J. Kabat
Printed name of counsel

cc: Counsel of Record

Reset Fields

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Statement of Related Cases

Pursuant to Federal Circuit Rule 47.5, appellant provides as follows:

(a) There have been no previous appeals from the *inter partes* review ("IPR") proceedings underlying this appeal before this or any other appellate court.

(b) *Skky, Inc. v. Manwin USA, Inc. and Manwin Holding, s.ar.l,* Civil No 13-2086 (PJS/HB) (D. Minn.), *Skky, Inc. v. Vivid Entertainment, LLC*, Civil No 13-2087 (PJS/HB) (D. Minn.), and *Skky, Inc. v. Playboy Enterprises,* Civil No 13-2089 (PJS/HB) (D. Minn.) will be directly affected by this Court's decision in the current appeal as they involve the same patent at issue here.

Jurisdictional Statement

The Patent Trial and Appeals Board ("PTAB") had jurisdiction over the IPR proceedings underlying this appeal pursuant to 35 U.S.C. §§ 6, 311-319. The PTAB entered a Final Decision in favor of Petitioners Mindgeek, S.A.R.L., Mindgeek USA, Inc., and Playboy Enterprises. ("Appellees") on January 29, 2016. Skky, Inc. ("Skky") timely filed a notice of appeal on March 30, 2016. This Court has jurisdiction over the appeal of the PTAB's Final Decision pursuant to 35 U.S.C. §§ 319 and 141, and 28 U.S.C. § 1295(a)(4)(A).

Statement of the Issues

Skky submits the following issues for review on appeal:

(1) whether the PTAB erred in failing to construe the claim term "wireless device means" beyond determining that the term was not a means-plus-function limitation governed by 35 U.S.C. § 112 ¶ 6, including any finding or determination supporting or related to this issue;

(2) whether the PTAB erred in determining that even if the claim term "wireless device means" was a means-plus-function limitation governed by 35 U.S.C. § 112 ¶ 6, "the corresponding structure in the specification is not limited to the multiple-processor embodiment as depicted in Figure 2," including any finding or determination supporting or related to this issue;

(3) whether the PTAB erred in finding claims 1-3, 5, 15-21, and 23 of the '875 patent unpatentable under 35 U.S.C. § 103 over the combination of Rolf and MP3 Guide, including the Board's determination that Petitioners met their burden to show unpatentability by a preponderance of evidence and any finding or determination supporting or related to this issue;

(4) whether the PTAB erred in finding claim 22 of the '875 patent unpatentable under 35 U.S.C. § 103 over the combination of Rolf, MP3 Guide, and OFDM/FM, including the Board's determination that Petitioners met their burden to show unpatentability by a preponderance of evidence and any finding or determination supporting or related to this issue; and

(5) whether the PTAB erred in considering improper new arguments and evidence introduced for the first time in the Petitioners' Reply.

Statement of the Case

On August 1, 2014, Appellees filed a petition seeking a determination that claims 1-3, 5, and 15-23 of U.S. Patent Number 7,548,875 (the "'875 patent") were obvious and unpatentable in light of the asserted prior art. Appx69. In their petition, Appellees relied primarily on U.S. Patent No. 7,065,342 to Rolf ("Rolf") as the basis for their arguments. Appx77. Rolf had already been thoroughly vetted by the patent office during the prosecution of the '875 patent as it was the main reference for two rejections that patent owner eventually overcame to have the challenged claimed issued by amending the claims to include a means-plus-function limitation. Appx170. Nevertheless, the PTAB instituted review proceedings. Appx4642.

In so doing, the PTAB determined that the claims of the '875 patent were not means-plus-function claims governed by 35 U.S.C. 112 ¶ 6, despite both Appellees and Skky stating that the claims were means-plus-function claims in their petition and preliminary response, respectively. Appx4638; Appx71; Appx2278. Ultimately, the PTAB concluded that all of the challenged claims of the patent were obvious in light of the asserted prior art, and issued a final written decision finding the claims unpatentable. Appx24.

The PTAB's conclusion is erroneous. First, the PTAB erred in its construction of a key term of the '875 patent's sole independent claim, "wireless device means." As both parties noted in their briefing to the PTAB, the "wireless device means" language indicates that the claims of '875 patent are means-plus-function claims. Appx71; Appx2278. Regardless, the "wireless device means" terminology denotes a particularized structure not present in the prior art nor obvious to one of ordinary skill at the time of invention. The '875 patent's dependent claims further distinguish the asserted prior art. During the IPR proceedings, Appellees also improperly raised new arguments for the first time in their reply brief. Accordingly, the PTAB committed error on multiple levels in reaching its final conclusion.

A. The '875 Patent and Its Prosecution History.

The inventors of the '875 patent, Mr. John Mikkelsen and Dr. Robert Freidson, worked together in the early 2000s to develop and patent a means to transmit high quality audio and/or visual files to mobile devices. Appx4645. The two inventors were uniquely positioned to design the invention described in the '875 patent.

Mr. Mikkelsen's background is in the entertainment industry. Appx5600. As part of his work, he created high quality sound clips that sounded like songs played on the radio. *Id*. Mr. Mikkelsen then used those sound clips to replace the normal alerts, consisting of simple chimes and beeps, on his computer. *Id*. As the age of cellular phones was just dawning, Mr. Mikkelsen believed that cellular phone users would want to play high quality audio and/or visual files, such as his sound clips, on their cellular phones. *Id*.

The missing piece to Mr. Mikkelsen's idea came from his introduction to Dr. Robert Freidson. Dr. Freidson possesses a Ph.D. in computer science and mathematics from Steklov Mathematical Institute in St. Petersburg, Russia. *Id*. He is also the inventor on several patents related to telecommunications industry. *Id*. Dr. Freidson is currently a mathematics professor at St. Petersburg Electrical Engineering University and serves as the chairman of the Russian National Research Center on computer science. Appx5601. Dr. Freidson possesses extensive experience in specialized wireless transmission and telecommunications. Appx5600-5601. Dr. Freidson provided the technical expertise relating to wireless delivery to

cellular devices and the playback of high quality audio and visual files on those devices. *Id*.

Together, the two inventors devised the invention capable of wirelessly receiving and then playing back high quality audio and/or visual files, such as Mr. Mikkelsen's sound clips. Appx26. They did so in the early 2000s, long before smartphones existed, let alone the iPhones and Galaxies of today. *Id*. Mr. Mikkelsen and Dr. Freidson then applied for the '875 patent, encompassing their invention. *Id*.

1. The '875 patent claims an innovative means for transmitting high quality digital files to mobile devices.

Cellular phones at the time of invention could only display low quality images and play simple chimes or tones. Appx43 1:34-38. They could not wirelessly receive and play back "compressed digital rich media." Appx169. The '875 patent addresses this problem by claiming an invention comprising a means of compression, storing, and transmitting high quality, content rich audio and/or visual files to a particularly structured wireless device. Appx60 33:14-32.

The '875 patent includes one independent claim:

> A method of wirelessly delivering over the air one or more digital audio and/or visual files from

> one or more servers to one or more wireless device means comprising:
>
> compressing said one or more digital audio and/or visual files, wherein said audio and/or visual files comprise one or more full or partial master recordings of songs, musical scores or musical compositions, videos or video segments, movies or movie segments, film or flu segments, one or more image clips, television shows, human voice, personal recordings, cartoons, film animation, audio and/or visual advertising content and combinations thereof, and wherein said compressing comprises normalizing, sampling and compressing said digital audio and/or visual files;
>
> storing compressed audio and/or visual files in one or more storage mediums; and
>
> transmitting to said wireless device means said compressed audio and/or visual files wirelessly over the air, with or without an Internet network.

Id.

Key to the invention is the term "wireless device means" found in the preamble of claim 1. Indeed, it was only after the inclusion of this term that the Examiner allowed the '875 patent to issue. Appx163; Appx170. *See also infra* Argument Sections B(1) and (2). By adding the "wireless device means" language, the applicants invoked a means-plus-function limitation under 35 U.S.C. 112 ¶ 6. Appx163.

The dependent claims further limit the claimed invention. For example, claim 18 requires that the "compressed digital audio and/or

visual file is delivered to said wireless device means independent of an Internet connection or other computer based system." Appx60 34:40-43. Claim 21 limits the compressed digital audio and/or visual file to "a segment of a full song, musical composition, or other audio recording or visual recordings." *Id*. 34:51-53. Claim 22 defines the method of transmitting the file to the wireless device means, calling for the "use of OFDM." *Id*. 34:54.

OFDM, or orthogonal frequency-division multiplexing, is a method of transmitting data in parallel, over a series of sub-channels that overlap without interfering. Appx4916. At the time of invention, the use of OFDM in cellular networks was not routine. *Id*. Indeed, 3G cellular networks did not use OFDM, despite considering using OFDM instead of CDMA.[1] Appx4928. This is in part because cellular phones are mobile devices, and are subject to the Doppler shift. Appx4916-4917. The Doppler shift causes the frequency of the received signal at the cellular phone receiver to shift either higher or lower, depending on whether the phone receiver is travelling towards the transmitter or away from the transmitter. *Id*. This

[1]It was not until the next generation cellular networks (LTE or 4G) that OFDM was utilized. Appx4931.

effect dramatically increases the complexity of interpreting the transmitted signal at the cellular phone receiver. *Id*. Thus, the "use of OFDM" in conjunction with the "wireless device means" per claim 22 was innovative at the time of invention.

In preparing the application for the '875 patent, Dr. Freidson created a prototype of the invention to test the patented design. Appx1293 ("I developed a new and novel conceptual design based on my scientific and technical background in wireless (radio) communication systems, and I made several laboratory prototypes to find and test different complex engineering solutions (e.g. OFDM)"). In developing the prototype, Dr. Freidson "built a PSB (printed circuit board) that was actually a wireless MP3 player . . . for use with cell phones to receive and play compressed digital music." *Id*. This was necessary because, at the time, no one had created a cellular phone capable of employing OFDM principles for wireless delivery or playing back high quality audio and/or visual files.[2] *Id*.

[2] Building on its prototype, Skky attempted to market a commercial embodiment of its invention. These efforts were ultimately unsuccessful.

2. The ’875 patent was thoroughly vetted during prosecution.

After a lengthy prosecution process, the ’875 patent issued on June 16, 2009 and claimed priority to U.S. Application No. 60/301,115, which was filed on June 27, 2001. Appx26. During prosecution, the applicants overcame a number of rejections in light of the prior art. Appx 1169; Appx1261. This process led to the inclusion of the “wireless device means” language in the independent claim. Appx203.

The Examiner determined that the closest piece of prior art was Rolf. Appx170. This was because the applicants claimed a “wireless electronic device.” Appx213-214; Appx1261-1264. To overcome the prior art, the applicants submitted a number of amendments altering the scope of the claims. Appx176; Appx204. In addition, the applicants conducted multiple interviews with the Examiner. Appx174-154; Appx201-203. The applicants also shared Dr. Freidson’s prototype invention with the Examiner, accompanied with a declaration from Dr. Freidson explaining the work involved in developing the prototype. Appx1292-1296. At this time, the Examiner suggested that the applicants amend the claim to include language invoking 35 U.S.C. § 112 ¶ 6. Appx175. Applicants first proposed amending “wireless electronic device” to “wireless communication device

means." Appx185. After further discussions with the Examiner, applicants agreed to amend the term once more to "wireless device means." Appx203; Appx213. The Examiner added this language, and allowed the patent to issue, in an Examiner's amendment. Appx163.

In issuing the '875 patent, and distinguishing Rolf, the Examiner noted that "wireless device means" was "an essential component of the system implementing the method." Appx169. The '875 patent disclosed a patentable invention because it required a cellular device "inclusive of 'board 203' which includes the 'main blocks' recited in page 14, lines 23-25 and the following supporting disclosure."[3] Appx163. Accordingly, the Examiner concluded that "[n]either the previously cited prior art Rolf nor prior art noted below or in combination with other prior art reach and suggest the combinations of methods as claimed . . . ." Appx170. Indeed, [a]n update to forward and backward citations of Rolf failed to produce prior art to address this combination of claim elements." *Id*. Thus, the '875

[3] In the published patent, the "main blocks" referenced on page 14, lines 23-25 of the application correspond to the disclosure of column 14, lines 46-50 of the published '875 patent. Appx50 ("The board 203 includes the following main blocks: a Digital Signal Processor (DSP) 300, a flash memory element 302, a Random Access Memory (RAM) element 304, an initial bootstrap chip 306, an analogous interface element 308, and a digital interface element 310.").

patent issued, after eight years of examination, due to the claimed structure of the "wireless device means."

B. The Petition and Institution Decision.

Skky sued Appellees, and a number of other alleged infringers, in the District of Minnesota on July 31, 2013, claiming that Appellees' websites, accessed on mobile devices, infringed the claims of the '875 patent. Appx64. On August 1, 2015, Appellees petitioned the PTAB for *inter partes* review of the '875 patent.[4] Appx61.

Appellees sought invalidation of the claims of the patent on the grounds that the clams were, *inter alia*, obvious in light of Rolf in view of the MP3 Guide publication. Appx68-69. Appellees also stated independent claim 1 contained a means-plus-function limitation due to the "wireless device means" term. Appx72. For claim 22, requiring the use of OFDM, Appellees also relied on the OFDM/FM publication for additional support.

Skky timely filed its preliminary response on November 13, 2014. Appx2269. In its preliminary response, Skky agreed that "wireless device means" was a means-plus function limitation, but disagreed that the

[4] To correct formatting defects present in the original petition, appellees filed a corrected petition on August 15, 2014. Appx61. The PTAB still afforded Appellees a filing date of August 1, 2014. Appx2267.

asserted art rendered the patented claims obvious. Appx2278. Indeed, Skky pointed out that Appellees' primary piece of prior art had already been analyzed in great detail by the Examiner, who concluded that the claims of the '875 patent were distinct. Appx2298-2300.

Nevertheless, the PTAB instituted *inter partes* review on February 3, 2015 to determine whether the claims of the '875 patent were obvious in view of Rolf, the MP3 Guide publication, and the OFDM/FM publication. Appx4642. Further, despite the parties' agreement that the "wireless device means" term invoked 35 U.S.C. § 112 ¶ 6, the PTAB determined that the "wireless device means" term "is not defined by a function." Appx4638. The PTAB then concluded that no further construction of the term was necessary at that time. Appx4639.

C. The Asserted Prior Art.

The PTAB instituted *inter partes* review of the '875 patent based on three asserted prior art references: Rolf, MP3 Guide, and OFDM/FM.

1. Rolf.

U.S. Patent No. 7,065,342 to Rolf ("Rolf"), titled "System and Mobile Cellular Telephone Device for Playing Recorded Music," was applied for on November 22, 2000 and issued on June 20, 2006. Appx1000. Rolf

discloses a method for transmitting data to a wireless communication device. Appx1006 1:25-28. Figure 4 of Rolf depicts a "block diagram of a conventional wireless communication device utilized in accordance with the principles of the present invention. Appx1007 4:65-67.

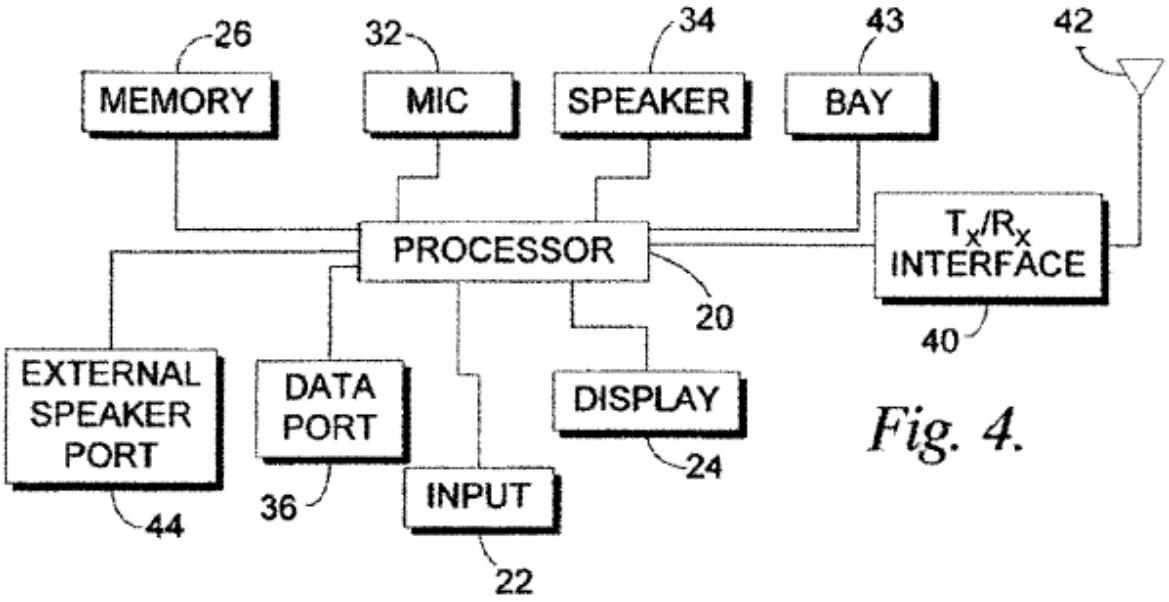

Fig. 4.

Appx1003.

As Figure 4 demonstrates, the wireless communication device described in Rolf consists of only a single processor, element 20. *Id*. The specification also notes that the structure of the wireless communication device, including a cellular phone, was "well known" in the art. Appx1009 7:59-60. Rolf also describes various transmission methods utilizing the

"well known" structure depicted in Figure 4. Appx1012 13:13-19. Rolf described this transmission as utilizing a third generation network – 3G. *Id*.

2. MP3 Guide.

MP3: The Definitive Guide ("MP3 Guide"), published in 2000, is "a guide to MP3 creation and playback principles in general." Appx404. MP3 Guide also contains a discussion of some portable devices capable of playing MP3 files. Appx623-625. MP3 files, however, are not delivered to these devices wirelessly. Instead, a cable (either serial, USB, or parallel), connects the portable device to a computer so that MP3s can be transmitted via that wired connection. *Id*. Nor are any of the portable devices disclosed by MP3 Guide cellular phones. Cellular phones are only mentioned in a passage stating that Ericsson was planning to release a cellular phone capable of playing MP3 files in the future. Appx636. MP3 Guide does not describe the structure of this phone or provide any indication that MP3 files would be wirelessly delivered to this theoretical cellular phone.

3. OFDM/FM.

The OFDM/FM Frame Synchronization for Mobile Radio Data Communication ("OFDM/FM") article was written by William D. Warner and Cyril Leung and was published in August 1993. Appx958. The article

details the results of a series of experiments conducted using OFDM over a mobile analog radio channel in a pure ALOHA network to transmit signal data wirelessly. *Id*. As a consequence of taking place in a pure ALOHA network, OFDM/FM recognizes that "each OFDM frame has to be synchronized independently." Appx960. In addition, the bandwidth overhead for data transmission is necessarily small because the available spectrum in a pure ALOHA environment is limited. *Id*. The resulting bit error rate was adequate for the experiment, but it would not be acceptable from large scale applications. Appx968; Appx4919.

C. The PTAB Proceedings.

After the PTAB instituted *inter partes* review, Skky timely filed its response to the petition on April 29, 2015. Appx4644. Although Skky disagreed with the Court's conclusion that claim 1 was not a means-plus-function claim, Skky argued that the "wireless device means" term still required the specific structure contemplated by the inventors and the Examiner at the close of prosecution. Appx4667-4678. To that end, Skky proposed "wireless device means" be construed to mean "a device capable of receiving data over a cellular communications network and having

multiple processors wherein one or more processors is primarily dedicated to processing the compressed multimedia data." Appx4667.

Under this construction, Skky distinguished the asserted prior art from the specific structure called for by the "wireless device means" language and thus the art did not render the claims obvious. Specifically, Skky argued that the asserted art did not disclose multiple processors, at least one of which being primarily dedicated to processing compressed multimedia data. Appx4667-4678.

Further, the asserted art did not render obvious the additional limitations of the dependent claims of the '875 patent. Appellees relied solely on MP3 Guide to disclose the delivery of a compressed audio and/or visual file to a "wireless device means" independent of the Internet or other computer based system, relying on its disclosure of and FTP system. Appx93. Skky noted, however, that MP3 Guide teaches that FTP is an Internet based system. Appx4689-4690. And, even if it were not, Appellees' expert witness testified that the FTP system involves the use of a "personal computer/network"—in other words, a computer based system. Appx340. Nor did the asserted art disclose a "segment" of a full song, musical

composition, or other audio or visual recording, per claim 21. Appx4691-4693.

With regards to claim 22's requirement that wireless delivery utilize OFDM, Skky explained that the asserted art, and other art accessible to a person of ordinary skill at the time of invention, taught away from using OFDM in cellular devices. Appx4695. Indeed, combining the invention described in Rolf with the method of using OFDM as described in OFDM/FM would lead to an inoperable, nonfunctional device. Appx4696. To create a working device, a person of ordinary skill would have to commit to an undue amount of experimentation and do so without an expectation of success. Appx4699. Thus, one of ordinary skill would not be motivated to combine the asserted references to develop the invention claimed in the '875 patent. Appx4700.

Appellees filed their reply in support of their petition on July 22, 2015. Appx4974. In the reply, Appellees submitted arguments, for the first time, relating to the construction of the term "wireless device means" as a term not invoking 35 U.S.C. § 112 ¶ 6. Appx4979. Appellees for the first time stated that only the term "wireless device" should be construed, and proposed a construction of "a device having wireless capability."

Appx4980. There is no support for this construction in Appellees' petition. Appellees also presented new arguments in the reply supporting their theory that the asserted art rendered the claims of the '875 patent obvious. Appx4988. Appellees admitted as much when directly confronted by the PTAB during trial. Appx5594-5595 ("JUDGE BLANKENSHIP: Back to claim 18. I understand this reliance on Rolf was not in the petition? Mr. Gasparo: That's correct, Your Honor. In the corrected petition, Petitioners relied on the MP3 Guide.").

Skky presented the issue of Appellees' new arguments to the PTAB seeking relief. Appx5557. Because the PTAB determined that "wireless device means" was not a means-plus-function limitation in its institution decision, after the petition was filed, Skky sought a surreply to address Appellees new claim construction arguments. Appx5558. Skky also sought to strike the other arguments that Appellees first raised in reply. Appx5562. The PTAB allowed Skky a surreply, and permitted Skky to file a brief submission identifying the arguments and evidence it believed went beyond the scope of the reply. Appx5559; Appx5570. Once this briefing was completed, the PTAB conducted a trial on the patentability of the '875 patent. Appx5580.

D. The PTAB's Final Written Decision.

On January 29, 2016, the PTAB entered its final written decision, finding claims 1-3, 5, and 15-23 of the '875 patent obvious and unpatentable in view of the prior art. Appx1. First, the PTAB addressed the construction of the "wireless device means" term. Appx6. The PTAB reiterated its position that "wireless device means" did not invoke 35 U.S.C. § 112 ¶ 6. Appx9. The PTAB also rejected Skky's proposed construction of the term, concluding that the "wireless device means" was not required to have multiple processors. Appx11. The PTAB did not provide any further guidance as to the meaning of "wireless device means," and simply concluded that "[n]o further construction is required for the purposes of this decision." Appx13.

Because it rejected Skky's proposed construction, the PTAB also found that Rolf disclosed the "wireless device means." Appx15. Further, because MP3 guide taught the "normalizing" and "sampling" limitations of claim 1, the claim was obvious to one of ordinary skill. Appx14. With regards to claim 18, the PTAB concluded that because Skky's expert, Dr. Almeroth, only stated that an FTP server is "most typically" is accessed by the Internet, the testimony did not support a finding that the use of an FTP

server is limited to uses involving the Internet. Appx16-17. The PTAB also concluded that a segment of an album, under the broadest reasonable interpretation, could be a full song. Appx17. Thus, Rolf and MP3 guide taught the limitations of dependent claim 21. *Id*.

Finally, the PTAB also determined that the combination of Rolf, MP3 Guide, and OFDM/FM rendered claim 22 obvious. Appx22. The PTAB ruled that the teachings of OFDM/FM were applicable to mobile devices. Appx18. Further, the PTAB found Skky's arguments that OFDM presented problems relating to Doppler shift and bit error rate unavailing. *Id*; Appx20. Nor did the PTAB agree that testing in an ALOHA environment would be inapplicable to real world situations. Appx20. Rather, the PTAB concluded that the implementation of OFDM at the time of invention would not have been difficult and, indeed, would have been "implemented simply and inexpensively." Appx19. According to the PTAB, the use of OFDM would be a "particularly attractive" option for a person of ordinary skill. *Id*. Thus, the PTAB concluded that claim 22 was also unpatentable.

In sum, the PTAB found each of the claims under review unpatentable as obvious in view of the prior art. Appx24. Skky timely filed this appeal, seeking reversal of the PTAB's final decision.

Summary of the Argument

The ’875 patent issued after a lengthy prosecution process, during which the Examiner closely reviewed the relevant prior art. After a series of amendments, the patent’s claims were sufficiently narrowed to overcome the teachings of the prior art. These amendments led to the addition of the “wireless device means” claim to the term. In so doing, the applicants indicated that they were claiming particular structure beyond conventional cellular phones.

The “wireless device means” is a specialized phone consisting of multiple processors, one of which is primarily dedicated to processing the compressed audio and/or visual files that are wirelessly delivered to the device. Support for these elements is also found throughout the specification of the patent, including a drawing showing the “wireless device means” including a specialized digital signal processor in addition to the processor found in a conventional cellular phone. Thus, properly construed, the “wireless device means” must include at least these components. Although the structure of the “wireless device means” was unique at the time of invention, it has become common in modern cellular phones.

Appellees filed a petition for *inter partes* review against the '875 patent. The petition relied almost entirely on Rolf, a prior art patent that was the subject of multiple rejections during the prosecution of the '875 patent. In other words, the Examiner had already considered Rolf for the exact same reasons as argued in Appellees' petition. Because the applicants specifically amended the claims of the '875 patent to include the "wireless device means" term to overcome Rolf, "wireless device means" includes additional limitations beyond what is disclosed in Rolf. Further, as the Examiner concluded, a person of ordinary skill would conclude that Rolf does not render the claims of the '875 patent obvious.

Despite a clear prosecution history distinguishing Rolf, the PTAB nevertheless determined the claims of the '875 patent were invalid in light of Rolf. In so doing, the PTAB improperly shifted the burden of proof from Appellees to Skky. This is contrary to Federal Circuit precedent. The PTAB similarly based its opinion on arguments that were not presented in Appellees' petition. Recently, this Court held that this was also error. *Magnum Oil Tools Int'l*, 2015-1300, 2016 U.S. App. LEXIS 13461 at *29-30. (Fed. Cir. July 25, 2016). For these reasons, and the reasons discussed in detail below, the PTAB's Final Written Decision is premised on reversible

error. The Court should reverse the PTAB's decision and confirm that the claims of the '875 patent are valid over the prior art asserted in the petition.

Argument

The PTAB erred in its determination that claims 1-3, 5, and 15-23 of the '875 patent were obvious under 35 U.S.C. § 103 and thus unpatentable. The PTAB's error stemmed from a fundamental misunderstanding of the claimed invention described in the '875 patent and by misconstruing the key term "wireless device means." Indeed, the PTAB ignored the thoughtful consideration of the asserted prior art by the patent Examiner, who determined the claims of the '875 patent were patentable over Rolf. Further, in the Final Written Decision, the PTAB improperly shifted the burden of proof from Appellees to Skky and relied on arguments not included in the petition. For all of these reasons, the PTAB's decision is flawed, and should be reversed.

A. Standard of Review.

The Federal Circuit reviews the PTAB's legal determinations *de novo* and the factual findings underlying those determinations for substantial evidence. *Dynamic Drinkware, LLC v. National Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). The PTAB's findings are supported by substantial evidence "if a reasonable mind might accept the evidence to support the finding." *Id*. In an IPR proceeding, the "burden of proof is on the petition

to prove unpatentable those issued claims that were actually challenged in the petition for review and for which the board instituted review." *Nike, Inc v. Adidas AG*, 812 F.3d 1326, 1334 (Fed. Cir. 2016). That burden does not shift to the patent owner "in the adjudicatory context of an IPR." *In re Magnum Oil Tools,* 2016 U.S. App. LEXIS 13461 at *16.

Obviousness is a legal question based of underlying facts. *Id*. (citing *In re Gartside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000)). Thus, the legal conclusion of obviousness is reviewed *de novo*, while the factual findings related to the obviousness determination is reviewed for substantial evidence. *Merck & Cie v. Gnosis S.P.A.*, 808 F.3d 829, 833 (Fed. Cir. 2015). The facts underlying an obviousness determination are "(1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; (3) the level of ordinary skill in the art at the time the invention was made; and (4) objective evidence of nonobviousness, if any." *In re Kubin*, 561 F.3d 1351, 1355 (Fed. Cir. 2009). "When an obviousness determination relies on the combination of two or more references, there must be some suggestion or motivation to combine the references." *Intelligent Bio-Systems, Inc. v. Illumina Cambridge, Ltd.*, 821 F.3d 1359, 1368 (Fed. Cir. 2016). There must be some sort of "rational underpinning" supporting an obviousness

conclusion. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). The factfinder must determine "whether a person of ordinary skill in the art would be motivated to combine those references, and whether in making that combination, a person of ordinary skill would have had a reasonable expectation of success." *Dome Patent L.P. v. Lee*, 799 F.3d 1372, 1380 (Fed. Cir. 2015).

Claim construction is a legal question that is reviewed *de novo*, while the factual determinations underlying the claim construction is reviewed for substantial evidence. *Microsoft v. Proxyconn, Inc.*, 789 F.3d 1292, 1297 (Fed. Cir. 2015) (citing *Teva Pharms. U.S.A., Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 841-842 (2015)). The PTAB affords the claims their broadest reasonable interpretation during construction. *Cuzzo Speed Techs v. Lee*, 195 L. Ed 2d 423, 439 (2016). The broadest reasonable interpretation does not simply mean the broadest interpretation – the PTAB's construction must be reasonable in light general claim construction principles. *Microsoft*, 789 F.3d at 1298; *PPC Broadband, Inc. v. Corning Optical Communs. RF, LLC*, 815 F.3d 747, 755 (Fed. Cir. 2016) ("Above all, the broadest reasonable interpretation must be *reasonable* in light of the claims and the specification."). Indeed, there is no requirement "that each and every claim ought to be interpreted

to cover each and every embodiment." *PPC*, 815 F.3d at 755 (citing *Baran v. Med. Device Techs., Inc.*, 616 F.3d 1309, 1316 (Fed. Cir. 2010)); *Pacing Techs, LLC v. Garmin Int'l, Inc.* 778 F.3d 1021, 1026 (Fed. Cir 2015) ("where the patent describes multiple embodiments, every claim does not need to cover every embodiment"). In construing the claims, intrinsic evidence to the patent, including the specification and the file history, is of primary importance. *Vitronics Corp. v. Conceptronic*, 90 F.3d 1576, 1582 (Fed. Cir. 1996) ("It is well settled that . . . the court should first look to the intrinsic evidence of record, *i.e.*, the patent itself, including the claims, the specification, and, if in evidence, the examination history.)

B. The PTAB Erred in its Construction of the Term "Wireless Device Means."

"Wireless device means," a key term to the '875 patent, is found in preamble of independent claim 1 of the '875 patent. Appx60 33:16. The claim recites "A method of wirelessly delivering over the air one or more digital audio and/or visual files from one or more servers to one or more wireless device means . . . ." *Id*. 33:14-16. Although the preamble is generally not limiting, there is an exception when the preamble breathes life into the claim. *Pacing Tech, LLC v. Garmin Int'l, Inc.*, 778 F.3d 1021, 1024

(Fed. Cir. 2015). In those situations, the preamble language is considered in construing the claims. *Id*.

Here, the "wireless device means" must be considered for any proper claim construction, as it appears in the preamble of claim 1 and forms the antecedent basis for subsequent uses of the term. Appx60 33:30 ("said wireless device means"). In allowing the claims to issue over the prior art, the Examiner described the "wireless device means" as "an essential component of the system implementing the method." Appx169. Indeed, the particular structure of the "wireless device means" is what distinguished the '875 patent from prior art inventions such as Rolf. The Examiner stated that "wireless device means" included the "main blocks" of board 203 embedded in a cellular phone: "a Digital Signal Processor (DSP) 300, a flash memory element 302, a Random Access Memory (RAM) element 304, an initial bootstrap chip 306, an analogous interface element 308, and a digital interface element 310." Appx163.

Accordingly, when properly construed, the "wireless device means" should, at a minimum, encompass these components. When properly construed as a means-plus-function claim, these "main blocks" provide sufficient structure for the wirelessly delivering function.

Even if the claim is not treated as a means-plus-function claim, Skky's proposed construction of "wireless device means" conforms to the disclosure in the specification and the prosecution history. During the *inter partes* review, Skky argued that "wireless device means should be construed as "a device capable of receiving data over a cellular communications network and having multiple processors wherein one or more processors is primarily dedicated to processing the compressed multimedia data." The PTAB erred in rejecting this construction.

Indeed, in its Final Written Decision, the PTAB did not provide a construction of the term "wireless device means." Rather than stating what the term means, the PTAB merely rejected Skky's proffered construction. Appx13 ("we determine that the term 'wireless device means' is not a means-plus-function limitation . . . the corresponding structure is not limited to the multiple-processor embodiment as depicted in Figure 2. No further construction is required . . . ."). "Wireless device means," however, has no plain and ordinary meaning and thus must be construed in order to compare scope of the claim to the prior art. *See O2 Micro Int'l v. Beyond Innovation Tech.*, 521 F.3d 1351, 1361 (Fed. Cir 2008) ("the 'ordinary' meaning does not resolve the parties' dispute, and claim construction

requires the court to determine what claim scope is appropriate in the context of the patent-in-suit"). Thus, the PTAB also erred for these additional reasons.

"Wireless device means" indicates that the claims are means-plus-function claims, and must be construed as such. Properly construed in light of the specification and prosecution history, the function of the "wireless device means" term is "to request, wirelessly receive, and process a compressed audio and/or visual file." The corresponding structure is "a device capable of receiving data over a cellular communications network and having multiple processors wherein one or more processors is primarily dedicated to processing the compressed audio and/or visual date and is operatively connecter to non-volatile and volatile memory, an initial bootstrap chip, an analog interface, and a digital interface or equivalents thereof." Should the Court determine that "wireless device means" is not a means plus function claim, the term should be construed as "a device capable of receiving data over a cellular communications network and having multiple processors wherein one or more processors is primarily dedicated to processing the compressed multimedia data." Only Skky's proposed construction is consistent with the specification and the

file history. The Court should vacate the PTAB's construction and adopt Skky's proposed construction in its place.

1. The claims of the '875 patent are means-plus-function claims

35 U.S.C. § 112 ¶ 6 (now amended to 35 U.S.C. § 112(f)) provides that a claim term may be expressed as a "means or step for performing a specified function without the recital of structure, material, or acts in support thereof." 35 U.S.C. § 112 ¶ 6. When a claim uses the word "means," there is a rebuttable presumption that the claim is invoking 35 U.S.C § 112 ¶ 6 and is a means-plus-function claim. *Robert Bosch, LLC v. Snap-On, Inc.*, 769 F.3d 1094, 1097 (Fed. Cir. 2014). Once a claim invokes 35 U.S.C § 112 ¶ 6, the court construes the claim by identifying limiting structure, material, or acts in the specification. *Id*. The prosecution history of the patent is relevant in determining whether the requisite link between the disclosed structure in the specification and the function. *Chi Bd. Options Exch., Inc. v. Int'l Sec. Exch., LLC*, 677 F.3d 1361, 1367 (Fed. Cir. 2012). Here, the PTAB first erred in failing to construe claim 1 as a means-plus-function claim.

The term "wireless device means" creates a presumption that claim 1 of the '875 patent is a means-plus-claim. During prosecution, the Examiner

noted that, by adding the "wireless device means" language, the applicants were invoking 35 U.S.C § 112 ¶ 6. Appx163. In the petition, Appellees make no attempt to rebut this presumption and, in fact, argue that the claim invokes 35 U.S.C § 112 ¶ 6. Appx72 ("The term 'wireless device means' is clearly a means-plus-function limitation."). Similarly, in its preliminary response, Skky also stated that claim 1 was a means-plus-function claim. Appx2278. Thus, the Examiner, Skky, and the Appellees were all in agreement—"wireless device means" makes claim 1 a means-plus-function claim under 35 U.S.C § 112 ¶ 6.

Nevertheless, the PTAB ignored the unrebutted presumption arising from the "wireless device means" language, concluding instead that "the term 'wireless device' is not purely functional language but language that denotes structure." Appx7. This argument was not presented to the PTAB during briefing below. Rather, both Appellees and Skky presented arguments relating to the function in the claim. Appx72 (Function: receiving the '[transmitted and] compressed audio and/or visual files wirelessly over the air, with or without an Internet network.'"); Appx2278-2279 (Function: To request, wirelessly receive, and process a compressed audio and/or visual file."). Although Skky and Appellees unsurprisingly

disagreed over the exact function of the claim, the parties were clear that both a function *and* the requisite structure exist. It was error for the PTAB to disregard the unrebutted presumption arising from the "wireless device means" term.

a. The function of the wireless device means is to request, wirelessly receive, and process a compressed audio and/or visual file.

The term "wireless device means" was added to the preamble of claim 1 of the '875 patent during prosecution at the Examiner's urging to overcome the prior art. Appx175; Appx203. The preamble also includes the functional language of "wirelessly delivering" the compressed audio and/or visual file to the "wireless device means." Appx60 33:14. Thus, the "wirelessly delivering" language defines the function of the "wireless device means." Viewed in light of the specification and prosecution history, this function encompasses requesting, wirelessly receiving, and processing a compressed audio and/or visual file.

From its very first words, the language of the patent makes it clear that the "wireless device means" functions by requesting, wirelessly receiving, and processing the compressed audio and/or visual files. Appx26 ("The files may be selected from and downloaded to the electronic device with or

without the use of a worldwide network connection."). Further support for the function can be found throughout the specification of the patent. *E.g.* Appx43 2:49-58 ("An accessory attachment to standard telephones can however be incorporated **to implement the delivery, storage, and playback capabilities of the present invention** . . . ."") (emphasis added); Appx49 12:47-50 ("the purpose of the chip 104 is to **store a selection of clips, allow for downloading of clips** to be stored on the chip 104, and **allow for playback of clips** . . . .") (emphasis added); Appx59 32:51-54 ("It is a further object of the present invention to provide an accessory attachment for cellular telephones and for landline telephones **which will enable the telephone to access and utilize sound files, including clips**.") (emphasis added). The PTAB did not address these statements in its Final Written Decision.

Further, the prosecution history of the '875 patent supports the function in claim 1. During prosecution, the claims were amended to overcome the prior art, including Rolf. Responding to the Examiner's rejection, the applicants stated that "Rolf in particular does not teach or disclose how to produce a wireless cellular device that **could receive, wirelessly, digitally compressed rich media, as selected and on demand,**

for storage on the wireless cellular device for playback as desired." Appx241 (emphasis added). The claimed invention was distinct from Rolf because "[w]ithout any wireless cellular device extent, or teaching anywhere how to produce one, applying the teachings of Breen to Rolf could not possibly yield predictable results of **the delivery, wirelessly, of compressed, digital content to such as device**." Appx242. (emphasis added). The applicants further distinguished the prior art by noting that the "wireless device means" contemplated "compressed master recordings, rich media, human voice, graphics, animations and other visuals **sent over the air wirelessly to a cell phone or other electronic device** . . . ." Appx4542. (emphasis added). Simply put, the applicants were clear that their invention claimed "transmitting master recordings and other rich media, such as described above, over the air." *Id*. The applicants also submitted the declaration of Dr. Freidson to further clarify the claimed function. Appx1292. The declaration describes a "wireless device means" that receives "compressed data wirelessly on demand from a server and play[s] back the received content . . . ." Appx1295.

In sum, the specification and the prosecution clearly indicate the function associated with the "wireless device means" term. Skky advocated

for this function in its briefing below: to request, wirelessly receive, and process a compressed audio and/or visual file. Thus, contrary to the PTAB's determination, the claim 1 is a means-plus-function claim. By rejecting this construction, and ignoring the functional language of the claim in its entirety, the PTAB erred.

b. The specification discloses adequate structure to support the "wireless device means" claim.

The '875 patent also discloses sufficient structure of the "wireless device means" that links to and performs the function of the means-plus-function claim. Skky defined that structure in the proceedings below as a device capable of receiving data over a cellular communications network and having multiple processors wherein one or more processors is primarily dedicated to processing the compressed audio and/or visual date and is operatively connecter to non-volatile and volatile memory, an initial bootstrap chip, an analog interface, and a digital interface or equivalents thereof.

The specification of the patent describes the base component of the "wireless device means" as "any commercially available cellular phone having capabilities for supporting a commend set for general telephone

control." Appx50 14:27-29. This cellular phone 202 would be compatible with various telecommunications standards for processing data and making phone calls. *Id*. So that it could perform the basic functions of a phone, a person of ordinary skilled would know that cellular phone 202 contained a processor. Appx4904-4905. In addition to that base processor, the specification states that cellular phone 202 is associated with either a specialized board 203 "implementing all required functions, similar to chip 104, that is incorporated in an accessory unit 204 attached to the cellular phone" or "a chip performing the same functions of the board . . . embedded in the phone itself . . . ." Appx50 14:16-22. Figure 2 makes this point clear, indicating that board 203 is part of cellular phone 202. Appx28.

The patent also provides a detailed description of the components of board 203 in Figure 3. Appx29. These components map to the structure Skky proposed in the proceedings below:

"Main Blocks"	**Skky's Proposed Structure**
"a Digital Signal Processor (DSP) 300" Appx50 14:46-50	One or more processors . . . primarily dedicated to processing the compressed audio and/or visual data
"a flash memory element 302" *Id*	Non-volatile memory
"a Random Access Memory (RAM) element 204" *Id*.	Volatile memory
"an initial bootstrap chip 306" *Id*.	An initial bootstrap chip
"an analogue interface element 308" *Id*.	Analog interface
"a digital interface element 310" *Id*.	Digital interface

Thus, when these "main blocks" of board 203 is combined with cellular phone 202, the result is Skky's proposed structure containing multiple processors.

The structure proposed includes a multiple processors with at least one "primarily dedicated" processor. This structure, too, is found in the specification. Cellular phone 202 contains at least one processor is the general purpose processor. An additional processor is the DSP in board 203. Accordingly, the structure consists of multiple processors. Further, a person of ordinary skill would know that a DSP is a specialized processor well-suited to process multimedia files, such as audio and video coding and decoding and multimedia storage and playback, as opposed to general processors, which are suited to merely rearrange stored data. Appx4909-

4910. At least this processor is primarily dedicated to processing the compressed audio and/or visual data received by the disclosed device. Thus, Skky's proposed structure is in line with the clear disclosure in the specification.

The prosecution history is also consistent with the specification and Skky's proffered structure of multiple processors. The prosecution history can inform the means-plus-function analysis. *Chi Bd. Options Exch.*, 677 F.3d at 1367. During the prosecution of the '875 patent, Dr. Freidson, one of the inventors, submitted a declaration describing a prototype of the invention. Appx1293-1296. Dr. Freidson acknowledged that the processor found in a conventional cellular phone was not powerful enough to process compressed audio and/or visual files. Appx1293. To solve this problem, Dr. Freidson developed an additional component, a wireless MP3 player containing its own processor, "for use with cell phones to review and play compressed digital music." *Id*. Thus, during prosecution, the applicants made it very clear that their invention consisted of more than one processor, and that one of those processors was primarily dedicated to processing the compressed audio and/or visual files received by the

device. Skky's proposed structure, linked to the claimed function, is thus supported by both the specification and the prosecution history.

2. If 35 U.S.C. 112 ¶ 6 does not apply, "wireless device means" should be construed as "a device capable of receiving data over a cellular communications network and having multiple processors wherein one or more processors is primarily dedicated to processing the compressed multimedia data."

The term "wireless device means" is not a term of art, nor does it have a plain and ordinary meaning in the field of wireless data transmission. Thus, failing to construe "wireless device means" or basing a decision on the plain and ordinary meaning of the term does not resolve the parties' dispute. Thus, the PTAB erred in its construction. *O2 Micro*, 521 F.3d at 1361 ("the ordinary meaning of a term does not resolve the parties dispute, and claim construction requires the court to determine what claim scope is appropriate in the context of the patents-in-suit."). Further, for the purposes of obviousness analysis, the PTAB needs to determine the scope of the claims in comparison to the prior art. *In re Kubin*, 561 F.3d at 1355; *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966).

The proper construction of "wireless device means" is "a device capable of receiving data over a cellular communications network and having multiple processors wherein one or more processors is primarily

dedicated to processing the compressed multimedia data." Skky proposed this construction in the proceedings below. Skky's construction is consistent with both the '875 patent's specification and prosecution history. These are the primary sources of evidence for the proper construction of a term. *See Vitronics*, 90 F.3d at 1582 ("It is well settled that . . . the court should look first to the intrinsic evidence of record, *i.e.*, the patent itself, including the claims, the specification, and, if in evidence, the examination history"). The PTAB thus erred in rejecting Skky's proposed construction.

a. The intrinsic record of the '875 patent discloses that a "wireless device means is a device capable of receiving data over a cellular communications network.

The specification of the '875 patent makes it clear that a "wireless device means" must be capable of receiving data over a cellular communications network. Figure 2 is a diagram of a system embodying the patented method "using a cellular network infrastructure." Appx50 13:33-34. The '875 patent describes how a sound clip reaches the wireless device means, being transmitted "through the phone line of the network to a cellular service provider 208" and then "to the cellular phone 202." Appx51 15:36-37. The plain language of the specification thus indicates that the

patent contemplates the use of a cellular communications network and that the "wireless device means" is able to receive data over that network.

The prosecution history also shows that the "wireless device means" must be able to receive data over a cellular network. In the Notice of Allowance, when referring to the inventive aspects of the patent and the wireless device means, the Examiner stressed the importance of "such a wireless **cellular** device" and the unexpected "successful digital delivery of such compressed digital rich media, either through an audio channel or data channel." Appx169 (emphasis added). Thus, the intrinsic evidence is clear—"wireless device means" must be able to receive data over a cellular network.

b. The intrinsic record of the '875 patent discloses that a "wireless device means" is a device with multiple processors.

Throughout the specification, the '875 patent indicates that the "wireless device means" comprises multiple processors. The patent describes the base component of the "wireless device means" as a cellular phone 202. Appx50 14:27-29. This cellular phone is "any commercially available cellular phone having capabilities for supporting a command set for general telephone control. *Id*. Further, a "commercially available

cellular phone" is compatible with various telecommunications standards for processing data and making phone calls. Appx4904-4905. One of ordinary skill would understand that this functionality would require processor to accomplish these tasks. *Id*. A processor would also be necessary for the basic functions of a cellular phone, such as navigating the phone's menu, inputting a phone number, and other general controls. *Id*.

In addition to the processor found in the conventional phone, the specification is clear that the "wireless device means" contains an additional processor. The specification describes a specialized board 203 that "is incorporated in an accessory unit 204 attached to the cellular phone." Appx50 14:15-25. Although the specification describes board 203 as incorporated into an accessory unit, it is clear that, alternatively, "a chip performing the same functions of the board may instead be embedded in the phone itself . . . ." *Id*. Figure 2 of the patent makes this distinction between the cellular phone 202 and board 203 (or an embedded chip performing the same functions) clear, showing board 203 as separate and apart from cellular phone 202:

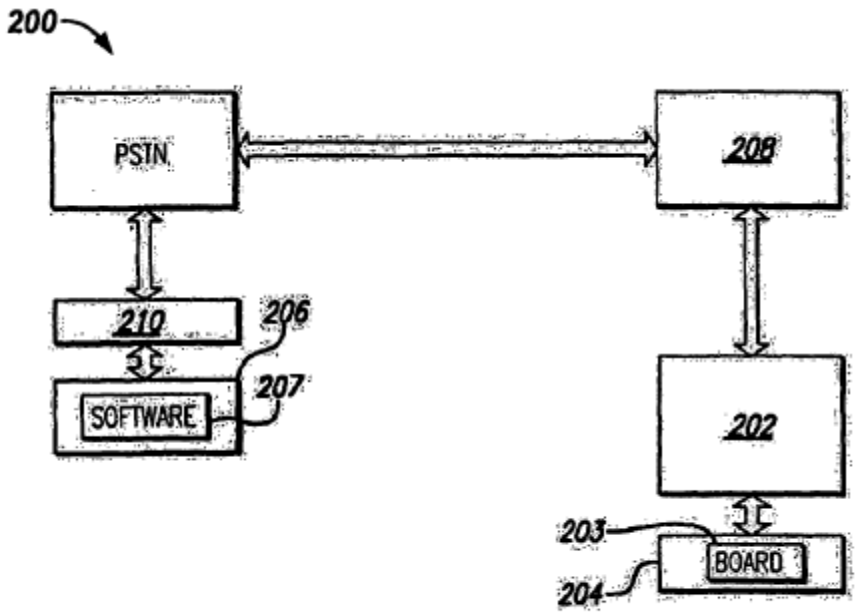

FIG. 2

Appx28. Board 203 contains various components or "main blocks," including a "Digital Signal Processor (DSP). Appx50 14:47. Figure 3, a diagram of board 203, also details this component as "processor DSP" 300:

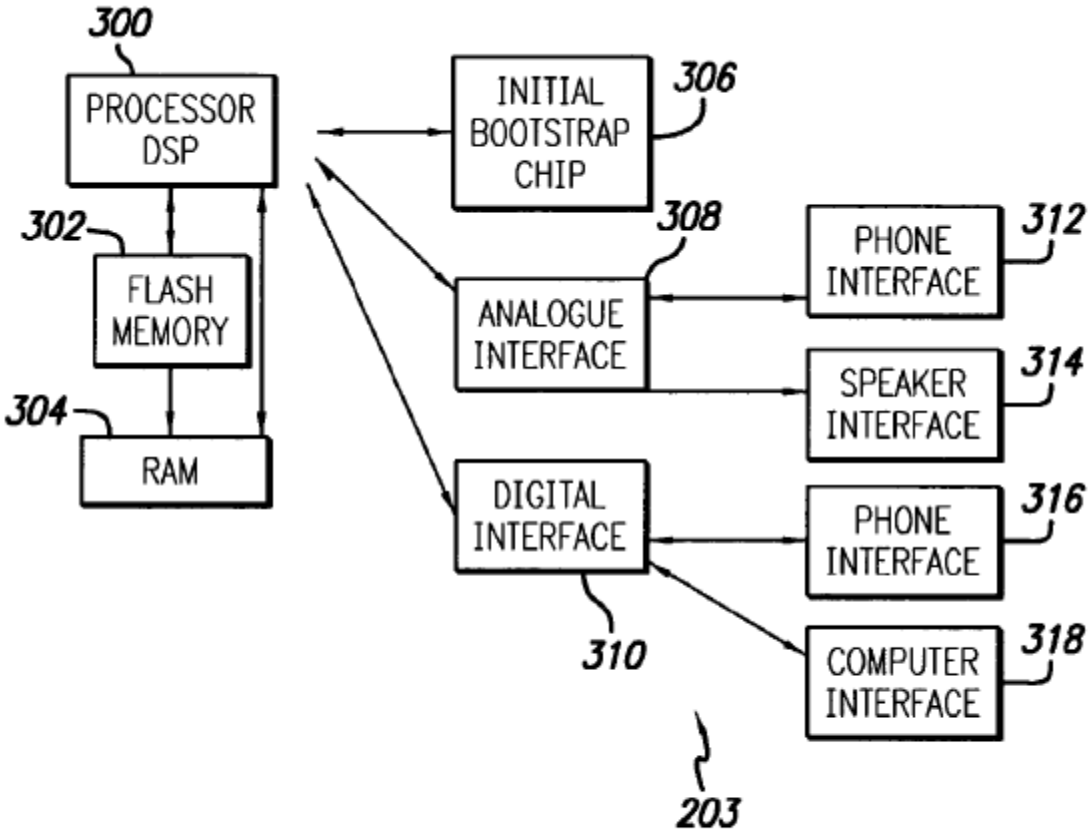

FIG. 3

Appx29. Thus, it is clear from the specification that the "wireless device means" consists of multiple processors.

The prosecution history also supports Skky's construction. During the '875 patent's prosecution, Dr. Freidson, one of the patent's inventors, submitted a declaration describing the prototype "wireless device means" he created to test the invention. Appx1293-1296. Consistent with the specification, the prototype consisted of multiple processors. Appx1293. Dr. Freidson explained that this was necessary to overcome the processing

limitations of conventional cellular phones at the time of invention. *Id*. To work around these limitations, Dr. Freidson developed an additional component, a wireless MP3 player with its own dedicated processor "for use with cell phones to receive and play compressed digital music." *Id*. Combined with the cellular phone, this device formed the prototype "wireless device means."

The Examiner's comments in allowing the '875 patent to issue over the prior art also indicates that the "wireless device means" consists of multiple processors. In the Notice of Allowance, the Examiner noted that the "wireless device means" was "an essential component of the system implementing the method." Appx169. Rolf, the closest prior art, was distinguished because the patented method required the use of a new type of cellular device—one "inclusive of 'board 203' which includes the 'main blocks' recited in the in page 14, lines 23-25 and the following supporting disclosure." Appx163. These main blocks include "a Digital Signal Processor (DSP) 300." Appx50 14:47. The Examiner thus focused on the inventive structure of the invention, including a second processor, to distinguish the claims of the '875 patent from the prior art. The "wireless device means" must therefore be a cellular device with multiple processors.

c. The intrinsic record of the ′875 patent discloses that a "wireless device means" is a device that includes one or more processors primarily dedicated to processing the compressed multimedia data.

The specification also discloses that one or more of the additional processors is primarily dedicated to processing compressed multimedia data. Figures 2 and 3 are diagrams of a system including the "wireless device means" and board 203, respectively. Appx28-29. The patent also makes clear that board 203, or an embedded chip capable of performing the same functions, is a part of the "wireless device means." Appx28. Board 203 consists of a number of components, including a digital signal processor. Appx50 14:46-50. One of ordinary skill would know that a digital signal processor is a specialized processor designed to carry our particular operations on data, as opposed to a general purpose processor which is suited to simply rearranging stored data. Appx4909-4910. Specifically, digital signal processors are well-suited for multimedia processing, including audio and video decoding and multimedia file storage and playback.[5] *Id*. A "wireless device means" includes such a dedicated processor. Appx50 14:47.

[5] A digital signal processor is also well suited for performing the Fast Fourier-Transforms used in OFDM modulated signals. See Section ___.

The patent indicates that the purpose of the dedicated digital signal processor, referred to in some instances as a "microchip," is to "store a selection of clips, allow for downloading of clips to be stored on the chip 104, and allow for the playback of the clips . . . ." Appx50 14:16-22. In other words the digital signal processor allows the patent to request and receive compressed audio and/or video files. Without the additional processor, the "wireless device means" could not accomplish the claimed function.

Further evidence that the "wireless device means" contains multiple processors comes from the declaration submitted by Dr. Freidson, the co-inventor of the patent, during the prosecution of the '875 patent. Appx1292. In his declaration, Dr. Freidson described that, at the time of the invention, cellular phone technology was not capable of receiving and playing back content-rich digital media. Appx1293. Because of this, in order to test his method, Dr. Freidson had to develop a printed circuit board that functioned as a wireless MP3 player. *Id*. This board, when connected to the cellular phone, permitted the device to receive and play back compressed multimedia data. *Id*. It was the addition of this board, including a dedicated digital signal processor, which allowed the invention to function. Thus, the inclusion of a processor, primarily dedicated to processing the

compressed multimedia data, is a necessary part of the "wireless device means" and must be included in the proper construction.

3. The PTAB erred in rejecting Skky's proposed constructions.

The PTAB erred in construing the "wireless device means" as being capable of having a single processor. In rejecting Skky's arguments in the proceedings below, the PTAB relied on the patent's disclosure of an "I-Pod™ type listening device" as evidence that the invention contemplates a single processor design. Appx7. First, as an initial matter, there is no evidence of the structure of the "I-Pod™ type listening device" in the specification, beyond the "main blocks" discussed by the Examiner, including a separate processor 300. Indeed the, specification only refers to an "I-Pod™ **type**" device, not an I-pod™. Appx58 30:51 (emphasis added). Any such device would need to have the same structure as a "wireless device means," including multiple processors. For this reason alone, the PTAB erred in rejecting Skky's proposed construction and structure.

Indeed, when the iPod™ was released in October 2001, music could not be loaded onto the device wirelessly. Appx4906-4907. Instead, the iPod™ required the user to connect the device to a computer running Apple's iTunes™ program to add music to the device's library. *Id*. Wireless

capabilities were not available in the iPod™ line until the release of the first iPod Touch™ in September 2007. Appx4907. Thus, at the time of invention, there was no way that an iPod™ could be a "**wireless** device means," capable of **wirelessly** receiving compressed audio and/or visual files.

Further, Dr. Freidson's declaration during the patent's prosecution discussed the "I-Pod type™ listening device." In his declaration, Dr. Freidson described the creation of his prototype. Appx1293. Building on a conventional cellular phone, which was unable to receive and play back compressed "rich media files," Dr. Freidson "developed and built a PSB (printed circuit board) that was actually a wireless mp3 player (compare with Apple iPhone) . . ." *Id*. Dr. Freidson combined the PSB he developed with the cellular phone to create his prototype "wireless device means." *Id*. Thus, while this device may be an "I-Pod type™ listening device" in that it contains a PSB similar to that of an iPhone, the wireless device means still contains the multiple processors—one in the cellular phone and one in the PSB. The PTAB erred by ignoring this clear disclosure from one of the patent's co-inventors.

The PTAB also relied on the specification's disclosure of another embodiment of the invention to support its final decision. Appx10. That

alternative embodiment, the software embodiment, is described by the patent as "a software system may be integrated with the existing hardware chip of a conventional cellular phone without the need for additional hardware." Appx50 14:22-25. Skky need not, however, claim every embodiment disclosed in the specification. *PPC Broadband, Inc. v. Corning Optical Commc'ns RF, LLC,* 815 F.3d 747, 755 (Fed. Cir. 2016) ("This does not mean, however, that each and every claim out to be interpreted to cover each and every embodiment . . . [t]he fact that once construction may cover more embodiments does not categorically render that construction reasonable.") (citing *Baran v. Med. Device Techs., Inc.*, 616 F.3d 1309, 1316 (Fed. Cir. 2010)). Here, Dr. Freidson's declaration during prosecution made it clear that the claims at issue contemplated a device with multiple processors. Appx1293 ("at the time of invention cell phones had very small amounts of memory and very slow DSP . . . I also developed and built a PSB (printed circuit board) that was actually a wireless mp3 player . . . I then assembled all element of the system and then tested and adjusted and installed a working prototype . . . ."). Thus, the software embodiment discussed in the specification is not relevant to the claimed invention, which pertains to a device with multiple processors.

4. "Wireless device means" must be more than Rolf's "wireless communication device."

The PTAB also erred in construing the claims to cover no more than Rolf. During prosecution, the Examiner identified Rolf as the closest prior art to the pending claims. Appx170. Indeed, the applicants faced multiple rejections in view of Rolf, which involved a "wireless communication device." Appx 1169; Appx1261. Applicants only overcame these rejections by amending the claims to include the "wireless device means" term per the Examiner's suggestion. Appx174-154; Appx201-203. Thus, even if "wireless device means" is not construed as a means-plus-function claim, it still contains additional limitations beyond Rolf.

During the prosecution process, the '875 patent originally contained the term "wireless electronic device." Appx214-215. With this language, the Examiner rejected the application in light of Rolf. Appx1261-1264. Skky sought an interview with the Examiner to discuss the rejection. Appx174-175. During the interview, the Examiner suggested adding "means" language to overcome the rejection. *Id*. Skky did so, amending the "wireless electronic device" term to read "wireless communication device means" to "more clearly and definitely" claim the invention "inclusive of

'board 203' which includes the 'main blocks' recited in para. 0111 and the following supporting disclosure." *Id*. The "main blocks" imparted a specific structure to the invention: "The board 203 includes the following main blocks: a Digital Signal Processor (DSP) 300, a flash memory element 302, a Random Access Memory (RAM) element 304, an initial bootstrap chip 306, an analogous interface element 308, and a digital interface element 310." Appx50 14:46-50.

After amending the claims, Skky conducted another interview with the Examiner. Appx203; AppxAppx213-214. At the conclusion of this meeting, the term "wireless communication device means" was amended again to "wireless device means." *Id*. It was upon the addition of the "wireless device means" language that the Examiner found the claims patentably distinguishable over Rolf. Appx170. The Examiner distinguished the conventional "mobile cellular telephone" disclosed by Rolf by referencing the "main blocks," the structure, of the "wireless device means. Appx163; Appx170. It was these added "main blocks" that allowed the claims to overcome Rolf and issue.

The PTAB's Final Written Decision reverts the "wireless device means" back to the original "wireless electronic device" language,

defeating the purpose of the prosecution process. The decision pays only lip service to the Examiner's determination, stating that the PTAB is not under any obligation to accept a disclaiming claim construction offered during prosecution. Appx8. Here, however, the point of the amendment was to overcome Rolf, the very art at issue here. The prosecution of the '875 patent lasted years and during that time the Examiner became familiar with the patent's claims and the related art. After rejecting the patent application numerous times in light of Rolf, the Examiner determined that the addition of the "wireless device means" language imparted additional specific structure that distinguished the '875 patent from the "mobile cellular telephone" disclosed in the prior art. Appx170.

The PTAB disregarded this evidence and determined that a wireless device means was essentially a conventional mobile cellular phone that does not require any additional structure. This eliminates the narrowing of the term made clear in the prosecution history. Regardless of how "wireless device means" is construed, one thing is certain—the construction must be something patentably distinct from Rolf. Accordingly, the "wireless device means" cannot be the same as the "mobile cellular telephone" or "wireless communications device" disclosed

in Rolf. Nor can it be a simple "wireless electronic device," as originally claimed. The prosecution history makes very clear that the "wireless device means" imparts additional limitations to the claims. Accordingly, the PTAB erred in its treatment of the "wireless device means" term. The Court should vacate the PTAB's construction and reverse because the PTAB failed to construe this term and then apply the construction to the art presented in the petition. At a minimum, the Court should remand the case with instructions to consider the prior art cited in the petition in view of the proper construction.

5. Whether or not 35 U.S.C. 112 ¶ 6 applies, the PTAB's decision and Appellees' arguments are unsupported.

Appellees' obviousness arguments, and the PTAB's analysis regarding the same, is flawed in that whether or not independent claim 1 is a means-plus-function claim, the "wireless device means" must contain specific elements, including multiple processors, one of which is primarily dedicated to processing the compressed multimedia data sent to the device. Indeed, the petition does not demonstrate that these elements are present in the asserted prior art. Thus, in either scenario the claims of the '875 patent are valid.

C. The PTAB Erred in Determining Claims 1-3, 5, 15-21, and 23 of the '875 Patent were Unpatentable in Light of the Asserted Prior Art.

In the proceedings below, the PTAB determined that claims 1-3, 5, 15-21, and 23 of the '875 patent were unpatentable as obvious in light of the prior art asserted in the petition. Appx24. The petition, however, relies primarily on art that was thoroughly vetted by the Examiner during the prosecution of the patent. Further, when the claims are properly construed, the asserted art is missing key components of the claims at issue. Finally, absent impermissible hindsight bias, a person of ordinary skill would not be motivated to combine the asserted art. The PTAB must base its determination on the arguments submitted in the petition, not on what could have been submitted in the petition. *In re Magnum Oil*, 2016 U.S. App. LEXIS 13461 at *29-30. Indeed, the burden of proof starts with, and remains on, petitioners during the *inter partes* review proceedings. *Id*. Appellees did not meet this burden here. For all these reasons, the PTAB's determination of obviousness should be reversed.

1. The Petition presents no new grounds beyond what was considered by the Examiner.

For each of the reviewed claims, except for dependent claim 22, the Appellees rely only on either Rolf, MP3 Guide, or both as prior art. Claim

22 also relies on OFDM/FM in addition to Rolf and MP3 Guide. As discussed above in Argument Sections B(1) and (2), Rolf was already considered in detail by the Examiner during the prosecution of the patent. There, it was the structure of the "wireless device means" that distinguished Rolf's "mobile cellular phone." Appx163; Appx170. Appellees' petition does not argue that MP3 Guide or OFDM/FM teach this additional structure. Accordingly, since the "wireless device means" contains additional structure rendering it patentably distinct from the invention in Rolf, the petition fails to allege any grounds to invalidate the claims of the '875 patent. The PTAB cannot rewrite the petition during its final decision to encompass additional disclosure not originally included in the petition, but "must base its decision on arguments that were advanced by the party . . . ." *In re Magnum Oil Tools Int'l*, 2016 U.S. App. LEXIS at *30 (noting that it is the petitioner who bears the burden of proof "predicated on the petition"). Appellees submitted a petition that rehashes the same prior art already considered by the Examiner for the very same reasons and, thus, they have not met their burden. Accordingly, for this reason alone, the Court should vacate the PTAB's obviousness determination.

2. The asserted prior art does not disclose or render obvious a wireless device means.

"Wireless device means" is "an essential component" of the invention claimed in the '875 patent. Appx169. The "wireless device means" contains specific "main blocks" listed in the specification of the patent in addition to a conventional cellular phone. Appx163. These "main blocks" include an additional processor, primarily dedicated to processing compressed multimedia data. The asserted prior art does not disclose these elements, nor does it render them obvious to a person of ordinary skill in art. Indeed, based on the petition, "a reasonable mind" would conclude that Appellees' obviousness arguments were unsupported. Thus, Appellees did not meet their burden demonstrating obviousness of the claims by substantial evidence.

a. The asserted prior art does not disclose multiple processors

As discussed above, when construed in light of the patent specification and the prosecution history, the "wireless device means" term consists of multiple processors. In the petition, Appellees pointed to Figure 4 of Rolf as disclosing the structure of a "wireless device means." Appx79-82. Figure 4 of Rolf depicts what Rolf calls a "wireless communications

device." Appx1006 1:27. It is clear from the figure that the Rolf device only contains a single processor, labeled element 20:

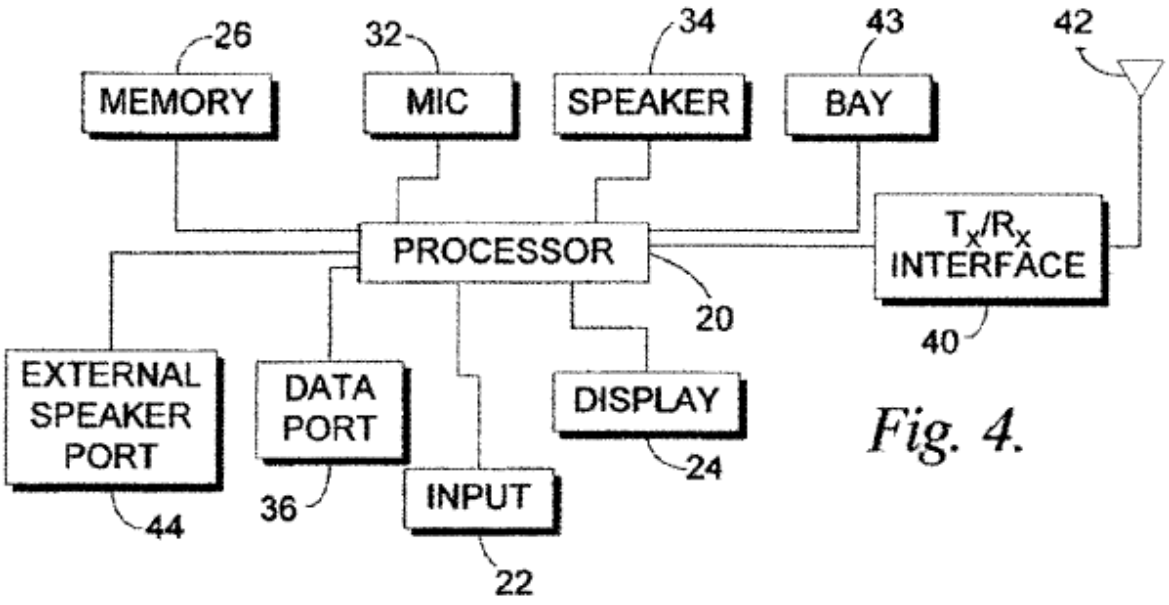

Fig. 4.

Appx1003.

Nothing in Rolf describes a multiple processor "wireless communication device." Nor does Rolf explain how an additional processor could be integrated into the depicted system. Rather, Rolf states that the "wireless communication device" is a conventional cellular phone. Appx1009 7:59-60. Based on the figure above and knowledge of conventional phones at the time of invention, a person of ordinary skill would understand that a conventional cellular phone would only have a single processor. Appx4904-4905. Thus, Rolf does not render a multiple processor system obvious.

The PTAB relied on the '875 patent's mention of an "I-Pod™ type listening device" as indicating that the '875 patent contemplates a single processor system. Appx7. As discussed above in Argument Section B(3), the "I-Pod™ type listening device" does not contain a single processor. Properly construed, the "I-Pod™ type listening device" would have the same structure of the "wireless device means" and contain multiple processors. Thus, neither Rolf nor the "I-Pod™ type listening device" provide a basis for an obviousness determination.

MP3 Guide does not address the deficiencies in Rolf's disclosure. MP3 guide only generally discusses the creation and playback of MP3s. Appx404. It does not describe the structure of any device, let alone the multiple processor design disclosed by the '875 patent. Even in view of MP3 Guide, the multiple processor design would not be obvious to one of ordinary skill.

b. The asserted prior art does not disclose a processor primarily dedicated to processing compressed multimedia data.

The asserted prior art also fails to disclose a processor primarily dedicated to the processing the compressed multimedia data that is sent to the "wireless device means." As discussed above in Argument Sections

B(1) and (2), Rolf only discloses a single processor, shown as element 20 in Figure 4. Appx1003. Rolf also states that this processor is responsible for many of the general tasks, beyond processing multimedia files, of a cellular phone. Appx47 7:49-60; Appx48 10:53-57; Appx50 13:38-40. These include handling telecommunications such as phone calls, requesting, receiving, and transferring data received by the device, processing selections from the user for the device to perform various functions, and other processes described in Rolf. *Id*. Thus, one of ordinary skill would know that the processor in Rolf is a general purpose processor – well-suited for generally moving data, but not the specialized DSP required in the '875 patent. Appx4909-4910. As such, Rolf's processor is not primarily dedicated to processing compressed multimedia data, as required by the proper construction of the "wireless device means" term. Nor is there any suggestion in the petition that a person of ordinary skill would be motivated to add a DSP to the system in Rolf. Although Appellees also cite to MP3 Guide, but MP3 Guide does not disclose the structure of any device that plays or processed an MP3 files. Thus, the asserted art does not render this aspect of the claim obvious.

3. The asserted prior art does not disclose or render obvious a segment of a full song, musical composition or other audio or visual recordings.

Claim 21 requires that the "compressed digital audio and/or visual file is a segment of a full song, musical composition, or other audio recording or video recordings." Appx60 34:51-53. The PTAB properly construed the term "segment" as "playable portion." Appx13-14. The PTAB improperly concluded, however, that the prior art taught the transmission of a full song, which "is a 'segment' (or 'playable portion') of an album." Appx17-18. In Rolf, the invention relates to the transmission of full, single songs. Appx1007 4:11-17; Appx1009 7:8-16. Here, a single, full length song is not a portion or segment of a song—it is a full song. Appx4925-4926. The claim does not relate to transmitting an entire single song from an entire single album. Rather, the plain language of the claim limits the transmission of data to a playable clip of a song. Thus, no reasonable mind would conclude that the PTAB's obviousness determination was supported by substantial evidence.

D. The PTAB Erred in Determining Claim 22 of the '875 Patent was Unpatentable in Light of the Asserted Prior Art.

Claim 22 requires the "use of OFDM." In its Final Written Decision, the PTAB concluded that Rolf and MP3 Guide, in combination with

OFDM/FM rendered this claim obvious. Again, the PTAB must rely on the arguments presented in the petition to determine if the Appellees met their burden of proof. *In re Magnum Oil*, 2016 U.S. App. LEXIS 13461 at *29-30. Based on the petition, one of ordinary skill, however, would not be motivated to combine OFDM/FM with Rolf. At the time of invention, one of ordinary skill would caution against the use of OFDM with a cellular device. Indeed, OFDM/FM combined with Rolf teaches an inoperable device. For these reasons, a reasonable mind would not conclude that the PTAB's determination that the combination of Rolf, MP3 Guide, and OFDM/FM renders claim 22 obvious was supported by substantial evidence.

Skky's expert explained that one of ordinary skill of the art would not be motivated to combine the teachings of OFDM/FM with the cellular device disclosed in Rolf for many reasons. First, Rolf teaches away from the method disclosed in OFDM/FM. A prior art reference may teach away from another reference "when a person of ordinary skill upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *Pozen Inc. v. Par Pharm., Inc.*, 696 F.3d 1151, 1164-65

(Fed. Cir. 2012). The prior art need not foresee "the specific invention that was later made, and warn[] against taking that path." *Spectralytics, Inc. v. Cordis Corp.*, 649 F.3d 1226, 1343 (Fed. Cir. 2011). Rather, the prior art reference may teach away if the reference suggests a different solution than the patent. *Id*.

The Rolf disclosure is inconsistent with OFDM/FM. Rolf specifically discloses the use of 3G modulation protocols. Appx1009 7:59-60. The standard setting organizations that created the 3G standard considered, and rejected, using OFDM in the 3G transmission scheme. Appx4929-4930. There is nothing in Rolf that suggesting that a different modulation scheme, OFDM, could be implemented into the claimed system. Thus, one of ordinary skill would not consider modifying Rolf to use OFDM in place of 3G. Neither the petition nor the PTAB's final decision resolves this conflict. Thus, the PTAB's obviousness determination is not reasonably supported by the asserted prior art.

Further, the PTAB disregarded testimony of Skky's expert that the combination of Rolf and OFDM/FM would result in an inoperative device. During the *inter partes* review, Skky submitted evidence that the cellular device taught by Rolf would require significant changes to utilize the

OFDM transmission taught by OFDM/FM. OFDM/FM's transmission occurs in a theoretical, idealized pure ALOHA[6] environment. Appx4918-4920. At the time of invention, a conventional cellular phone operated on a 2G network at a frequency of 800 MHz/1900MHz. Appx4933-4934. The AMPS and 3G networks also operate at a similar frequency. *Id*. OFDM/FM, on the other hand, teaches transmission at a much lower frequency—only 144 MHz. *Id*. Accordingly, one of ordinary skill would not view the two transmission schemes as compatible.

Skky's expert also explained that the OFDM/FM also teaches a bit error rate of 1×10^{-5}, which is not acceptable to transmit a high quality file. Appx967; Appx4934. Because of this high bit error rate, a person of ordinary skill would know that a lower bit error rate, of at least $1 \times 10^{-6,}$ would be necessary to transmit a high-quality file (such as an MP3 considered by Rolf). Appx4826; Appx4934. In order to get to an appropriate

[6] A pure ALOHA network means that if data is ready to be sent on the network, it is sent. Appx4919. If the message collides with another transmission on the network, the data is resent. *Id*. Thus, in a pure ALOHA network, a station will transmit its data even if the channel is already occupied by another station and thus collisions between data can and will occur. *Id*.. This is in contrast to time-based networks, such as cellular networks, in which data is transmitted in a particular timeslot to avoid collisions. *Id*.

bit error rate, Skky's expert explained that additional control techniques would need to be added to the OFDM/FM disclosure. Appx4933. Neither Rolf nor OFDM/FM—let alone the petition—suggest how this modification could be implemented.

Skky's expert also explained that it would to arrive at an operable device based on the combination of Rolf and OFDM/FM, a person of ordinary skill would be forced to undertake an undue amount of experimentation without any reasonable expectation of success. Thus, a person of ordinary skill would not be motivated to combine Rolf, MP3 Guide, and OFDM/FM. *Procter & Gamble Co. v. Teva Pharm. USA, Inc.*, 566 F.3d 989, 994 (Fed. Cir. 2009) (to prove obviousness a party must show that a person skilled in the art "would have been motivated to combine the teachings of the prior art references to achieve the claimed invention" and "have had a reasonable expectation of success in doing so") (citations omitted).

The PTAB did not cite to any evidence to rebut this testimony. Indeed, the PTAB based the bulk of its obviousness analysis on criticism of Skky's expert's testimony, rather than what was stated in the petition. This is error as a matter of law—the burden is on the petitioner to prove the invalidity

of the reviewed claims, not on the patent owner to prove that claims' validity. *In re Magnum Oil*, 2016 U.S. App. LEXIS 13461 at *17-18.

For example, the PTAB did not address the inapplicability of data obtained in a theoretical ALOHA environment to the 3G system taught by Rolf. Instead, the PTAB improperly shifted the burden to Skky to cite to "comparative data or other evidence in the record" beyond its expert opinion. Appx20. This is contrary to *Magnum Oil*'s explicit holding that the burden of proof does not shift to the patent owner during *inter partes* review. *In re Magnum Oil*, 2016 U.S. App. LEXIS 13461 at *17-18; *29-30. Absent criticism of Skky's expert testimony, the PTAB did not cite to anything in the petition or Appellee's expert declaration that explains how data from the ALHOA system would be utilized in a 3G system. Instead, the PTAB states that "Petitioner proposes using OFDM as a modulation technique for use over an analog FM channel." *Id*. But this does not explain why a person of ordinary skill would combine OFDM/FM with Rolf. Because this is missing from the PTAB's decision, and the petition, there is no reasonable support for the PTAB's conclusion.

Similarly, the PTAB did not provide a reasonable explanation to overcome the bit error rate shortcoming of the OFDM/FM article. Rather

than require Appellees to demonstrate that one of ordinary skill would be able to overcome this problem with the art, the PTAB seemed to require Skky to "show . . . that such techniques would have been beyond the level of skill of the ordinary artisan." Appx21. Once again, this was not Skky's burden.

Further, the PTAB attempted to resolve the bit error rate issue on Appellees' behalf. The PTAB states that, because the claims address the wireless delivery of compressed audio or video "for storage and later playback," the transmission of the file and the bit error rate, is irrelevant. *Id*. First, this is factually incorrect—wireless delivery of the file is transmission and, as Skky's expert testified, the bit error rate must be lower than what is disclosed in OFDM/FM. Appx4934. Even if the PTAB was factually correct, it still erred as a matter of law. This argument relating to the necessity of "transmission" was not included in the petition. This Court has held that the PTAB cannot advance arguments that the petitioner could have, but did not, raise in the petition. *In re Magnum Oil* 2016 U.S. App. LEXIS 13461 at *29-30. "Instead, the Board must base its decision on arguments that were advanced by a party, and to which the opposing party was given a chance to respond." *Id*. The PTAB did not do so here. Instead,

the PTAB based its opinion on its own novel arguments and shifted the burden of proof to Skky. For these reasons, as in *Magnum Oil*, the Court should reverse the PTAB's decision.

E. The PTAB Erred by Allowing Appellees to Submit New Arguments and Eevidence Raised for the First Time in Reply.

The PTAB also committed error by allowing Appellees to raise new arguments and grounds for unpatentability in their reply brief, flaunting the rules for *inter partes* review. 37 C.F.R. § 42.23(b) ("A reply may only respond to arguments raised in the corresponding opposition or patent owner response."). Skky filed a motion objecting to Appellees' new arguments, and Appellees admitted to including new arguments in the reply brief during the trial below. Appx5562-5563 ("JUDGE BLANKENSHIP: Back to claim 18. I understand this reliance on Rolf was not in the petition? Mr. Gasparo: That's correct, Your Honor. In the corrected petition, Petitioners relied on the MP3 Guide."). "[A] reply that raises a new issue or belatedly presents evidence will not be considered . . . ." Office Patent Trial Practice Guide, 77 Fed. Reg. 48,767 (Aug 14, 2012). *E.g.*, *Intelligent Bio-Systems, Inc. v. Illumina Cambridge, Ltd.*, 821 F.3d 1359,

1369 (Fed. Cir. 2016). Therefore, Appellees' reply brief should not have been considered by the PTAB.

Despite this admission, the PTAB did not strike the reply brief—the only document submitted by petitioners that presented an argument for obviousness based on a non-means-plus-function construction of the claims. During *inter partes* review, the PTAB must base its analysis on the petition submitted. *Id*. *See also*, *In re Magnum Oil Tools Int'l,* 2016 U.S. App. LEXIS 13461 at *29-30 (holding that the PTAB cannot rely on arguments that "could have been included in a properly-drafted petition."). Here, the reply brief is the *only* document submitted by Appellees that raise arguments relating to the construction of the "wireless device means" term as a non-means-plus-function claim. Further, the Appellees raised many new obviousness arguments in their reply, which Skky pointed out with particularity. Appx5562-5563. This included citing to Rolf for the first time to challenge dependent claim 18. Appx4988. The PTAB is not required to parse a reply brief to separate new, improper arguments from those made in reply, and therefore should have disregarded the reply brief in its entirety.

As the entire reply brief should have been stricken from the record, there is no evidentiary support for the PTAB's determination of invalidity of the challenged claims under a non-means-plus-function construction. As the PTAB is not able to and should not provide its own arguments or positions, and must instead rely upon the arguments properly presented by Petitioners, this Court should reverse the PTAB's decision because there is a complete lack of evidentiary support for such position.

Conclusion and Statement of Relief Sought

In its Final Written Decision, the PTAB erred in numerous ways. It improperly construed a key patent term, "wireless device means" inconsistently with the specification and the prosecution history. Based on this improper construction, the PTAB erroneously determined that the claims were invalid as obvious in light of the prior art. Since this analysis was fundamentally flawed, it should be reversed by the Court. For these reasons, and those detailed above, the Court should vacate the PTAB's construction and, at a minimum, remand for further proceedings in accordance with the proper construction.

Dated: August 8, 2016

Respectfully submitted,

By: /s/ *Andrew J. Kabat*
Andrew J. Kabat
Counsel for Patent Owner-Appellant

ADDENDUM

Start No.	End No.	Description
Judgment, Order or Decisions in Question		
Appx1	Appx25	Final Written Decision, dated January 29, 2016 (Paper 45)
Patent-in-Suit		
Appx26	Appx60	U.S. Patent No. 7,548,875 B2

Trials@uspto.gov
571-272-7822

Paper 45
Date Entered: January 29, 2016

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MINDGEEK, S.A.R.L., MINDGEEK USA, INC., and
PLAYBOY ENTERPRISES, INC.,
Petitioner,

v.

SKKY INC.,
Patent Owner.

Case IPR2014-01236
Patent 7,548,875 B2

Before HOWARD B. BLANKENSHIP, KRISTEN L. DROESCH, and ROBERT J. WEINSCHENK, *Administrative Patent Judges.*

BLANKENSHIP, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
Inter Partes Review
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. BACKGROUND

MindGeek, s.a.r.l., MindGeek USA, Inc., and Playboy Enterprises, Inc., (collectively, "Petitioner") filed a petition[1] requesting an *inter partes* review of claims 1–3, 5, and 15–23 of U.S. Patent No. 7,548,875 B2 (Ex. 1001, "the '875 patent") under 35 U.S.C. §§ 311–319. *See* Paper 4 ("Petition" or "Pet."). The Board instituted an *inter partes* review of claims 1–3, 5, and 15–23 on asserted grounds of unpatentability for obviousness. Paper 10 ("Dec. on Inst.").

Subsequent to institution, Patent Owner Skky, Inc. filed a patent owner response. Paper 21 ("PO Resp."). Petitioner filed a reply. Paper 28 ("Pet. Reply"). We authorized Patent Owner to file a surreply to Petitioner's Reply. Paper 32 ("Surreply").

Patent Owner filed a Motion to Exclude (Paper 33; "PO Mot. to Exclude"). Petitioner filed an Opposition to the Motion to Exclude (Paper 39; "Pet. Exclude Opp."), and Patent Owner filed a Reply (Paper 41; "PO Exclude Reply"). Petitioner filed a Motion to Exclude (Paper 35; "Pet. Mot. to Exclude"). Patent Owner filed an Opposition to the Motion to Exclude (Paper 38; "PO Exclude Opp."), and Petitioner filed a Reply (Paper 40, "Pet. Exclude Reply").

An oral hearing was held on September 23, 2015. A transcript of the hearing is included in the record (Paper 42; "Tr.").

The Board has jurisdiction under 35 U.S.C. § 6(c). This final written decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

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[1] This proceeding was terminated with respect to one party to the petition, General Media Communications, Inc. Paper 20 (Decision on Joint Motion to Terminate).

For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–3, 5, and 15–23 of the '875 patent are unpatentable.

A. Related Proceedings

According to Petitioner, the '875 patent is involved in the following lawsuits in the U.S. District Court for the District of Minnesota: *Skky, Inc. v. Manwin USA, Inc.*, No. 13-2086 (PJS/JJG); *Skky, Inc. v. Vivid Entm't*, No. 13-2087 (PJS/JJG); *Skky, Inc. v. Playboy Enters., Inc.*, No. 13-2089 (PJS/JJG); *Skky, Inc. v. Gen. Media Commc'ns.*, No. 13-2085 (PJS/JJG); and *Skky, Inc. v. Dada Entm't*, No. 13-2083 (PJS/JJG). Pet. 4. Patent Owner identifies a U.S. patent and several U.S. patent applications that may affect, or be affected by, a decision in this proceeding. Paper 6, 1–2.

B. The '875 Patent

The '875 patent relates to a method for delivery and playback of sound and image files on an electronic device. Ex. 1001, Abstract.

C. Illustrative Claim

Claim 1, reproduced below, is the sole independent claim in the '875 patent.

> 1. A method of wirelessly delivering over the air one or more digital audio and/or visual files from one or more servers to one or more wireless device means comprising:
>
> compressing said one or more digital audio and/or visual files, wherein said audio and/or visual files comprise one or more full or partial master recordings of songs, musical scores or musical compositions, videos or video segments, movies or

> movie segments, film or [film] segments, one or more image clips, television shows, human voice, personal recordings, cartoons, film animation, audio and/or visual advertising content and combinations thereof, and wherein said compressing comprises normalizing, sampling and compressing said digital audio and/or visual files;
>
> storing compressed audio and/or visual files in one or more storage mediums; and
>
> transmitting to said wireless device means said compressed audio and/or visual files wirelessly over the air, with or without an Internet network.

D. Asserted Prior Art

U.S. Patent No. 7,065,342 B1, June 20, 2006 (Ex. 1017, "Rolf").

Scot Hacker, *MP3: The Definitive Guide*, Mar. 2000 (Ex. 1009, "MP3 Guide").

OFDM/FM Frame Synchronization for Mobile Radio Data Communication, Aug. 1993 (Ex. 1015, "OFDM/FM").

E. Asserted Grounds of Unpatentability

We instituted *inter partes* review on the following grounds of unpatentability under 35 U.S.C. § 103(a):

References	Claim(s)
Rolf and MP3 Guide	1–3, 5, 15–21, and 23
Rolf, MP3 Guide, and OFDM/FM	22

II. ANALYSIS

A. Claim Interpretation

In an *inter partes* review, the Board construes claim terms in an unexpired patent using their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1275–79 (Fed. Cir. 2015), *cert. granted*, 72016 WL 205946 (U.S. Jan. 15, 2016) (No. 15-446). The claim language should be read in light of the specification, as it would be interpreted by one of ordinary skill in the art. *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004). The Office must apply the broadest reasonable meaning to the claim language, taking into account any definitions presented in the specification. *Id*. (citing *In re Bass*, 314 F.3d 575, 577 (Fed. Cir. 2002)). There is a "heavy presumption" that a claim term carries its ordinary and customary meaning. *CCS Fitness, Inc. v. Brunswick Corp*., 288 F.3d 1359, 1366 (Fed. Cir. 2002). The "ordinary and customary meaning" is that which the term would have to a person of ordinary skill in the art in question. *In re Translogic Tech., Inc*., 504 F.3d 1249, 1257 (Fed. Cir. 2007).

Our reviewing court also has explained:

> The first step in construing a means-plus-function limitation is to identify the function explicitly recited in the claim. The next step is to identify the corresponding structure set forth in the written description that performs the particular function set forth in the claim. Section 112 paragraph 6 does not "permit incorporation of structure from the written description beyond that necessary to perform the claimed function." Structural features that do not actually perform the

> recited function do not constitute corresponding structure and thus do not serve as claim limitations.

Asyst Techs, Inc. v. Empak, Inc., 268 F.3d 1364, 1369–70 (Fed. Cir. 2001) (citations omitted).[2]

B. Wireless Device Means

Claim 1 recites, in its preamble, a method of wirelessly delivering files "to one or more wireless device means." The final step of the claim recites "transmitting *to said wireless device means* said compressed audio and/or visual files wirelessly over the air, with or without an Internet network" (emphasis added).

There is a presumption that when the word "means" appears in a claim element in combination with a function, it is a means-plus-function element to which Section 112, sixth paragraph, applies. *Signtech USA, Ltd. v. Vutek, Inc.*, 174 F.3d 1352, 1356 (Fed. Cir. 1999). A claim element, however, that uses the word "means" but recites no function corresponding to the means does not invoke Section 112, paragraph 6. *Rodime PLC v. Seagate Tech., Inc.*, 174 F.3d 1294, 1302 (Fed. Cir. 1999).

The first step in construing a means-plus-function limitation is to identify the function explicitly recited in the claim. *See Asyst Techs, Inc. v. Empak, Inc.*, 268 F.3d at 1369–70. The "wireless device means" of claim 1, however, is not associated with or defined by a function. We acknowledge

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[2] Section 4(c) of the Leahy-Smith America Invents Act ("AIA") re-designated 35 U.S.C. § 112, paragraph six, as 35 U.S.C. § 112(f). Pub. L. No. 112-29, 125 Stat. 284, 296 (2011). Because the '875 patent has a filing date before September 16, 2012 (effective date of § 4(c)), we will refer to the pre-AIA version of § 112.

that the law does not require that a Section 112, sixth paragraph, limitation contain the literal phrase "means for" or be in the form of a nonce word followed by the word "for" and an associated function. For example, in *Signtech USA. v. Vutek, Inc.*, our reviewing court construed the term "ink delivery means." "[T]he claim element 'ink delivery means' uses the term 'means' in association with a function, namely 'ink delivery.' Although the phrase 'means for' is not used, the phrase 'ink delivery means' is equivalent to the phrase 'means for ink delivery,' because 'ink delivery' is purely functional language." 174 F.3d at 1356. The relevant inquiry is whether the term at issue is purely functional. *See Baran v. Med. Device Tech., Inc.*, 616 F.3d 1309, 1317 (Fed. Cir. 2010) (holding that the word "release" in the claimed "release means for retaining the guide in the charged position" was "not an idle description but a vital function to be performed by the means-plus-function element.").

In this case, however, the term "wireless device" is not purely functional language but language that denotes structure. The '875 patent provides examples of wireless devices, such as "cellular phone 202" (Fig. 2) and "I-Pod™ type listening device 1802" (Fig. 18). Ex. 1001, col. 14, ll. 14–18, col. 30, ll. 49–59.

In the Petition, Petitioner submits that the "wireless device means" is a means-plus-function limitation that is to be interpreted in accordance with 35 U.S.C. § 112, sixth paragraph. Pet. 9–12. After hearing from Patent Owner in its Preliminary Response (Paper 8), we determined, for purposes of the Decision to Institute, that "wireless device means" is not a means-plus-function limitation. Dec. on Inst. 5–7. We authorized a surreply to

Petitioner's Reply because Patent Owner had not had the opportunity to respond to Petitioner's views on our claim interpretation.

In its Patent Owner Response and Surreply, Patent Owner argues that the prosecution history of the '875 patent compels that the "wireless device means" be interpreted in accordance with 35 U.S.C. § 112, sixth paragraph. We acknowledge that the prosecution history indicates that instant claim 1 was allowed in response to the insertion of the term "wireless device means" into the claim, at the suggestion of the Examiner. The USPTO, however, is "under no obligation to accept a claim construction proffered as a prosecution history disclaimer, which generally only binds the patent owner." *Tempo Lighting, Inc. v. Tivoli, LLC*, 742 F.3d 973, 978 (2014). The meaning of "wireless device means," under the required broadest reasonable interpretation, is not precluded from review in this proceeding.

The only "function" recited *in the claims* that Patent Owner appears to rely on for its position with respect to application of Section 112, sixth paragraph, is the preamble of claim 1, which is said to include the "functional language" of "wirelessly delivering" the compressed file to the wireless device means. PO Resp. 7. "As such, the functional language of 'wirelessly delivering' defines the function of the 'wireless device means.'" *Id.* "[B]ased on the language of the claim, a person of ordinary skill in the art would interpret the function of the wireless device means as requesting, wirelessly receiving, and processing a compressed audio and/or visual file." *Id.* Patent Owner cites no authority for the proposition that the function of an element in a means-plus-function limitation may be defined by inference from language in the preamble of the claim, and we know of none. Patent Owner does cite, without explanation, to an unreported Markman Order

concerning a patent unrelated to the '875 patent. The District Court in that Order, however, came to the unsurprising conclusion that the function associated with a claimed "means for securing said device to a delivery system" is "securing the device to a delivery system." *AGA Medical Corp. v. W. L. Gore & Associates, Inc.*, No. 10-3734, 2012 WL 4479241, at *11 (D. Minn. Sept. 28, 2012). The Court came to the equally unsurprising conclusion that the function associated with a claimed "means for attachment to a delivery device" is "to attach the device to a delivery device." *Id.* at *13. We, therefore, are unconvinced that claim 1 defines the "wireless device means" in functional terms.

Assuming for the moment, however, that the "wireless device means" *is* to be interpreted according to Section 112, sixth paragraph, we note that Patent Owner argues the corresponding structure for the claimed "wireless device means" includes multiple hardware processors. In the '875 patent, a preferred embodiment may be described, inherently, as containing two processors — one in cell phone 202 and one in board 203 contained in accessory 204. Ex. 1001, col. 14, l. 13–col. 15, l. 17, Figs. 2, 3. Alternative embodiments of a "wireless device means," however, are not described as having multiple processors. *See, e.g., id.* at col. 30, l. 49–col. 31, l. 3, Fig. 18 ("I-Pod™ type listening device 1802"). Patent Owner contends, apparently, that the '875 patent *inherently* describes that the "I-Pod™ type listening device" requires multiple processors. PO Resp. 22–23. As set forth below, we need not determine if that contention is correct because (1) the claimed wireless device means is not limited to structures described in the Specification and equivalents thereof, and (2) even if it were, Patent

Owner does not address all the described embodiments of the wireless device means.

We must evaluate Patent Owner's arguments in light of the evidence that is before us. Patent Owner submits that "the patent" is not limited to an accessory unit as depicted in Figure 2. PO Resp. 18 n.2. Patent Owner quotes only a partial sentence from the '875 patent for disclosure that "'a chip performing the same functions of the board [that] may instead be embedded in the phone itself.'" *Id.* (quoting Ex. 1001, col. 14, ll. 15–25) (alteration by Patent Owner). The quoted sentence reads in full: "Although the system 200 [Fig. 2] is described as incorporating an accessory unit, it should be understood that a chip performing the same functions of the board may instead be embedded in the phone itself, *or a software system may be integrated with the existing hardware chip of a conventional cellular phone without the need for additional hardware.*" Ex. 1001, col. 14, ll. 19–25 (emphasis added). This software embodiment also is discussed elsewhere in the '875 patent. *See, e.g.*, Ex. 1001, col. 5, l. 66–col. 6, l. 2 ("A cellular phone, or similar device (having a processor, RAM, and flash elements) may be integrated with software at the time of manufacturing for implementing the system of the present invention."); col. 32, ll. 46–50 ("It is a further object of the present invention to provide a software system which may be integrated into existing cellular telephone hardware for enabling the cellular telephone to access and utilize sound files including clips, without the need for extra hardware.").

When the specification describes two or more distinct embodiments that perform the same recited function, one does not attempt to craft a single claim interpretation that is consonant with all structures in the specification

corresponding to the claimed functions. *Ishida Co. v. Taylor*, 221 F.3d 1310, 1316 (Fed. Cir. 2000). Further, though such "means plus function" limitations embrace all of the disclosed embodiments that correspond to the claimed function, the claims are not limited to any particular one of the disclosed embodiments. *See Micro Chem. Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1259 (Fed. Cir. 1999) ("Because alternative structures corresponding to the claimed function were described, the district court incorrectly limited 'weighing means' to the specific structures of the preferred embodiment."). Of particular relevance is our reviewing court's determination in the case of *Serrano v. Telular Corp.*, 111 F.3d 1578 (Fed. Cir. 1997). Although the specification disclosed discrete logic circuitry as a preferred embodiment, the invention was not limited to such circuitry because the specification also stated that the logic could be configured in software. *Id.* at 1583. Thus, even if the "wireless device means" were to be interpreted in accordance with Section 112, sixth paragraph, we are unpersuaded that such "means" is required to have multiple processors.

Patent Owner argues, in the alternative, that even if not interpreted in accordance with Section 112, sixth paragraph, the claimed "wireless device means" should be interpreted as "a device capable of receiving data over a cellular communications network and having multiple processors wherein one or more processors is primarily dedicated to processing the compressed multimedia data." PO Resp. 15. Patent Owner relies on a declaration submitted under 37 C.F.R. § 1.132 during prosecution by a co-inventor of the patent, which is said to provide "additional evidence" that the "means" includes a cellular device with "at least a second processor" in addition to a processor included with the device. PO Resp. 21. Patent Owner refers to

the Declaration (Ex. 1036) at paragraphs 4 and 5, contending that the paragraphs reveal: (1) a prototype contained a second processor dedicated to processing the data associated with compressed audio files; (2) one of ordinary skill in the art would know that a conventional cellular phone contains a single processor; and (3) the single processor was not powerful enough to process a compressed audio and/or visual file. *Id.* at 20–21. Patent Owner's arguments are unhelpful because they do not quote the statements from the Declaration that are deemed to provide the basis for Patent Owner's allegations. We find no indication in the cited paragraphs that a "second processor" was necessary, or even contemplated.

Patent Owner also relies on the Declaration of its expert, which alleges that a particular cell phone commercially available around the time of invention contained a processor. PO Resp. 17 (citing Ex. 2021 ¶¶ 45-46). We can assume there were cell phones available at the time of invention that contained a processor. It is not apparent, however, how that testimony may be relied upon to show that the '875 patent's disclosure limits the claimed "wireless device means" to "a device capable of receiving data over a cellular communications network and having multiple processors wherein one or more processors is primarily dedicated to processing the compressed multimedia data," as urged by Patent Owner.

Patent Owner refers also to one embodiment of a "wireless device means" described by the '875 patent that includes multiple processors. PO Resp. 18-20. But the "wireless device means" is not interpreted in accordance with Section 112, sixth paragraph. Our reviewing court has repeatedly warned against confining such claims to specific embodiments

described in the specification. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1323 (Fed. Cir. 2005) (en banc).

In view of the foregoing, on this record, we determine that the term "wireless device means" is not a means-plus-function limitation and, thus, is not governed by Section 112, sixth paragraph. Further, even if the term were to be so construed, the corresponding structure in the specification is not limited to the multiple-processor embodiment as depicted in Figure 2. No further construction is required for the purposes of this decision.

C. A Segment of a Full Song, Musical Composition or Other Audio Recording or Visual Recordings

Claim 21 depends from claim 1 and recites "wherein the compressed digital audio and/or visual file is a segment of a full song, musical composition or other audio recording or visual recordings." Patent Owner submits that the phrase "segment of a full song, musical composition, or other audio recording or visual recording" should be construed as a "playable portion of a song, musical composition, or other audio recording or visual recording." PO Resp. 25. As a basis for the interpretation, Patent Owner argues that the Specification of the '875 patent "discloses that a segment is simply a shorter, playable portion of a full song, musical composition, or other audio or visual recording." *Id.* at 25–26.

The patent refers, for example, to "[s]ound clips, which are segments of whole songs, musical compositions or other sound recordings." Ex. 1001, col. 11, ll. 3–5. The patent also refers to "a multiple number of clip segments from a single song, musical composition, or other sound recording played in sequence." *Id.* at col. 11, ll. 46–48.

We agree with Patent Owner that a "segment of a full song, musical composition, or other audio recording or visual recordings" as recited in claim 21 may be construed as a "playable portion of a song, musical composition, or other audio recording or visual recording."

D. Asserted Grounds of Unpatentability

1. Section 103(a) – Rolf and MP3 Guide

Rolf describes a mobile cellular telephone used to select a music recording from a remote source, with the phone wirelessly receiving the selected music recording into memory where it is available for playback by an audio player in the phone. Ex. 1017, at *[57]. Petitioner applies the teachings of Rolf and MP3 Guide in an asserted ground of obviousness as to claims 1–3, 5, 15–21, and 23.

Petitioner contends that Rolf describes the method of claim 1 with the exception of the "normalizing" and "sampling" limitations, which MP3 Guide describes as standard or well-known operations in applying MP3 compression to audio files. Pet. 20, 21–27 (claim chart). Petitioner relies on the testimony of Dr. Michael Kotzin (Ex. 1008). Petitioner submits that one of ordinary skill in the art would have combined the teachings of Rolf and MP3 Guide because each reference relates to digital audio files and teaches (MP3) compression processes for the files, achieving known results. Pet. 20– 21.

Patent Owner responds that Rolf does not disclose a structure consisting of multiple hardware processors, with one or more of the processors being "primarily dedicated" to processing compressed multimedia data, which Patent Owner contends is a structural feature of the

"wireless device means." PO Resp. 33–36. We are not persuaded, however, that the "wireless device means" is limited to a structure consisting of multiple hardware processors. As discussed above, we are not persuaded that the "wireless device means" is governed by 35 U.S.C. § 112, sixth paragraph. Moreover, even if the "wireless device means" were to be construed as a means-plus-function limitation under Section 112, sixth paragraph, Patent Owner relies on only one embodiment described by the '875 patent. The cell phone embodiment may be described, inherently, as containing two processors — one in cell phone 202 and one in board 203 contained in accessory 204. Ex. 1001, col. 14, l. 13–col. 15, l. 17, Figs. 2, 3. At least one alternative embodiment of a "wireless device means," however, is not described as having multiple processors. *See* § II.B, ***supra.***

a. Claim 18

Claim 18 depends from claim 1 and recites that the compressed file "is delivered to said wireless device means independent of an Internet connection or other computer based system." Patent Owner submits (PO Resp. 37) that the claim is supported by the Specification at column 16, line 31 through column 17, line 19, which describes a method for transferring data over an audio channel of a wireless telephone, whereby a customer need not use a wireless internet service provider.

For the requirements of claim 18, the Petition relies on MP3 Guide at page 286, which describes offering MP3 files for direct download over the World Wide Web "or through an FTP server." Pet. 31; Ex. 1009, 286.[3] The

[3] We cite to the document's page number when referencing Exhibit 1009.

Petition relies, further, on the Declaration of Dr. Kotzin (Ex. 1008). Pet. 31. Dr. Kotzin opines that one of ordinary skill in the art would recognize that file access from an FTP server need not be through the Internet, but the server "could reside on a separate personal computer / network which is not connected to the internet." Ex. 1008 ¶¶ 73–74.

Patent Owner argues that "MP3 Guide explicitly teaches that an FTP server uses the Internet." PO Resp. 38. Patent Owner does not, however, point to any disclosure in MP3 Guide that an FTP server or the FTP (file transfer) protocol is *limited to* use on the Internet. Patent Owner further argues that even if an Internet connection is not required, Petitioner's expert Dr. Kotzin testified in his Declaration that an FTP server for stored MP3 files could reside "on a separate personal computer/network which is not connected to the Internet," such that Dr. Kotzin "admits" that using FTP requires a computer based system. *Id.* at 37–38. Dr. Kotzin, however, describes the architecture of connecting to an FTP server on a private network using cellular remote access to a modem, rather than requiring some intervening computer between the server and the modem. *See* Ex. 1008 ¶ 74. Thus, although the FTP server could reside on a computer, Dr. Kotzin does not admit that the compressed file is delivered to the wireless device means using a computer. *Cf.* Ex. 1001, col. 16, ll. 55-57 ("A user can simply place a regular call to the specific number (e.g., an "800" number) to gain access to *the Server*" (emphasis added)). Patent Owner also refers for support to paragraphs 89 through 91 of the Declaration of its expert, Professor Kevin C. Almeroth. PO Resp. 38. Professor Almeroth, however, does not allege that access to an FTP server for delivery of files requires a "computer based system," but does allege that an FTP server is "most

typically" accessed via the Internet. Ex. 2021 ¶ 91. The testimony does not support the view that an FTP server is *limited to* use on or over the Internet.

b. Claim 21

Claim 21 depends from claim 1 and recites "wherein the compressed digital audio and/or visual file is a segment of a full song, musical composition or other audio recording or visual recordings." For disclosure or suggestion of the additional requirements of claim 21, the Petition refers to material in Rolf that includes column 8, lines 8 through 16, which states that a user may download "the single being played, or the entire album on which the single is located." Pet. 32–33; Ex. 1017, col. 7, ll. 8–16; Ex. 1008 ¶ 79. Patent Owner acknowledges that Petitioner cites to portions of Rolf "that disclose that a single full length song may be distributed rather than an entire album" but argues a "single full length song is not a segment of a song." PO Resp. 39. "The plain language of the claim limits the transmission to a segment of a song, or a playable portion of the song." *Id.* We disagree with Patent Owner's assessment of claim 21 because a "segment of a full song" is but one of the alternatives recited by the claim. Under the broadest reasonable interpretation, and consistent with Patent Owner's construction as a "playable portion of a song, musical composition, or other audio recording or visual recording" (§ II.C, *supra*), the claim is read as "segment" (or "playable portion") modifying "musical composition or audio recording" — and a single full length song is a "segment" (or "playable portion") of an album. Further, even if "segment" were to be read as modifying only "a full song," a single full length song from an album is,

at the least, an "other audio recording" in accordance with the claim because it is not "a segment of a full song."

2. Section 103(a) – Rolf, MP3 Guide, and OFDM/FM

Petitioner applies the teachings of Rolf, MP3 Guide, and OFDM/FM in an asserted ground of obviousness as to dependent claim 22, which recites "the use of OFDM." Petitioner submits that OFDM/FM teaches that orthogonal frequency division multiplexing ("OFDM") was used for data transmission over an analog FM channel such as one used with an analog cellular phone. Pet. 55–56. According to Petitioner, one of skill in the art who was considering how to transfer data over a cellular network would have "considered and likely used OFDM as a tool to facilitate the transfer of data." *Id.* at 56. Petitioner also relies on the testimony of Dr. Kotzin. *Id.* at 55–57 (citing Ex. 1008).

Patent Owner in its Response argues that the use of OFDM on cellular networks "was anything but routine," and submits that several disadvantages related to using OFDM were known around the time of invention. PO Resp. 42–43. Patent Owner relies on the Declaration of Professor Almeroth (Ex. 2021). As one drawback, Patent Owner submits that one would not have contemplated using OFDM on a cellular network because cellular phones are mobile receivers having signals subject to Doppler shift, for which the system must compensate. PO Resp. 42–43. Yet, the *title* of the OFDM/FM reference makes plain that device mobility was considered: "OFDM/FM Frame Synchronization for *Mobile* Radio Data Communication" (emphasis added). Moreover, although we acknowledge there may be tradeoffs in the selection of any particular modulation technique, we also are cognizant that

the OFDM/FM reference teaches "OFDM/FM is particularly attractive because it can be implemented simply and inexpensively by retrofitting existing FM communication systems." Ex. 1015, 302.[4] Further, in evaluating the weight to be accorded Patent Owner's arguments and evidence, we observe that the '875 patent does not teach that the inventors faced significant obstacles in implementing OFDM for data transmission. The patent, in fact, lists numerous benefits in the use of an OFDM modulation scheme, without any hint or indication that the inventors were the ones who discovered those benefits. Ex. 1001, col. 16, l. 60–col. 17. l. 3.

Patent Owner also alleges that, around the time of invention, OFDM was considered for implementation by cellular network standard setting bodies, but was ultimately rejected. PO Resp. 43 (citing Ex. 2021 ¶ 75). Patent Owner does not however, identify any of the "standard setting bodies" or allege why OFDM may have been "ultimately rejected." Moreover, even if the allegation were founded in fact, Patent Owner directs us to no evidence tending to show what factors a standard setting body might consider in setting a standard, and the relative weight given to each factor.

Patent Owner alleges that Rolf and OFDM/FM "teach away from each other" because Rolf teaches the use of 3G modulation protocols instead of OFDM. "Because 3G does not use an OFDM modulation scheme, Rolf teaches away from the process in OFDM/FM." PO Resp. 44 (citing Ex. 2021 ¶ 103). Although the prior art might teach more than "one" way, Appellant fails to point to any actual "teaching away" in either reference.

> A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be

[4] We cite to the document's page number when referencing Exhibit 1015.

> discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant. A reference does not teach away, however, if it merely expresses a general preference for an alternative invention but does not criticize, discredit, or otherwise discourage investigation into the invention claimed.

Depuy Spine, Inc. v. Medtronic Sofamor Danek, Inc., 567 F.3d 1314, 1327 (Fed. Cir. 2009) (internal quotations omitted). Neither reference warns against, or discourages the artisan from, using OFDM.

Patent Owner argues, further, there would be no expectation of success in combining Rolf and OFDM because Rolf uses a 3G network and OFDM uses an incompatible ALOHA network architecture. PO Resp. 46 (citing Ex. 2021 ¶ 111). The asserted ground of obviousness, however, does not propose combining a 3G network and an ALOHA network architecture. Rather, Petitioner proposes using OFDM as a modulation technique for use over an analog FM channel. Pet. 55–56. Patent Owner also submits that data resulting from experiments performed in "a pure ALOHA environment would have no bearing on real world data transmission." PO Resp. 45 (citing Ex. 2021 ¶ 78). Actually, Patent Owner's expert opines that data from such experiments would provide "little if any" insight on real world data transmission. Ex. 2021 ¶ 78. Patent Owner's expert does not, however, cite to any comparative data or other evidence in the record in support of the opinion. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.").

Patent Owner also alleges that the cellular device taught in Rolf would require "dramatic changes" to utilize OFDM transmission as taught by

OFDM/FM. PO Resp. 45 (citing Ex. 2021 ¶ 81). Actually, Patent Owner's expert opines that due to a relatively high bit error rate (BER), the system described by OFDM/FM "would likely require error control techniques" to be implemented at the receiver in order for complex data to be successfully received. Ex. 2021 ¶ 81. Even assuming that error control techniques would be required, Patent Owner's expert does not allege, let alone show, that such techniques would have been beyond the level of skill of the ordinary artisan. Moreover, we are not persuaded that the bit error rate associated with the OFDM/FM paper would discourage transmission of a compressed audio file or even a "high quality rich media file." PO Resp. 46. Patent Owner's expert refers to Exhibit 2020 (Handbook of Electrical Engineering Calculations) at 170 as support for the opinion that "to transmit MP3 data as taught by Rolf," a BER "better than 1×10^{-6} would be required." Ex. 2021 ¶ 110. Exhibit 2020 at 170, however, indicates that "[g]enerally, speech transmission requires a BER better than 10^{-6}, and video transmission requires BER $< 10^{-7}$ to provide acceptable signals." The instant claims, however, are not directed to speech or video "transmission" or streaming. The claims are directed to wireless delivery of compressed audio or video files (e.g., a compressed audio file of a human voice) for storage and later playback. *See* independent claim 1, dependent claims 2, 3, and 15. We, therefore, accord little weight to the view that the BER associated with OFDM/FM would be fatal to the combination proposed by Petitioner. Further, we are not persuaded that the combination as proposed would require "undue experimentation." PO Resp. 47–48. The evidence to which Patent Owner cites (Ex. 2021 ¶ 107) is testimony that merely alleges differences exist between the systems of Rolf and OFDM/FM.

Patent Owner also alleges that Petitioner has not shown a motivation to combine Rolf and MP3 Guide with the teachings of OFDM/FM. "Petitioners fail to address why one of skill would modify the transmission modulation used in Rolf with that provided in OFDM/FM." PO Resp. 49. Patent Owner's argument is factually incorrect and, thus, not persuasive. Petitioner submits, for example, that OFDM/FM was particularly attractive because it could be implemented simply and inexpensively by retrofitting existing FM communication systems. Pet. 57; Ex. 1015, 302.

E. Asserted Grounds — Conclusion

Upon review of the Petition and supporting evidence, as well as the Patent Owner Response, Surreply, and supporting evidence, we conclude that Petitioner has demonstrated, by a preponderance of the evidence, that claims 1–3, 5, 15–21, and 23 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Rolf and MP3 Guide, and that claim 22 is unpatentable under § 103(a) over the combination of Rolf, MP3 Guide, and OFDM/FM.

F. Patent Owner's Motion to Exclude

Patent Owner moves to exclude Petitioner's Exhibit 1046. PO Mot. to Exclude. In its Reply, Petitioner relies on Exhibit 1046 to show that a particular cell phone addressed by Patent Owner's expert in his Declaration included multiple processors. We did not, and need not, consider such arguments or evidence in connection with the Reply. We have determined that Petitioner has demonstrated, by a preponderance of the evidence that the challenged claims are unpatentable, without considering Petitioner's

arguments regarding the particular cell phone. Accordingly, we *dismiss* Patent Owner's motion to exclude as moot.

G. Petitioner's Motion to Exclude

Petitioner moves to exclude much of the testimony in Professor Almeroth's Declaration on the basis that he is not qualified to provide expert testimony in this proceeding. Most of Petitioner's arguments in support of the motion appear to address the weight to be given the testimony, as opposed to its admissibility. We have considered the testimony and assigned the weight to which we believe it is entitled.

Petitioner also moves to exclude Exhibits 2006 through 2020, filed with Professor Almeroth's Declaration, and testimony in the Declaration that is purported to rely on the Exhibits, on the basis that the Exhibits consist of inadmissible hearsay.

In any event, because consideration of Professor Almeroth's Declaration and Exhibits 2006 through 2020, to the extent relied upon by Patent Owner in its Response, does not affect the outcome in favor of Petitioner in this final written decision, Petitioner's motion to exclude is *dismissed* as moot.

III. CONCLUSION

For the foregoing reasons, we conclude that Petitioner has demonstrated, by a preponderance of the evidence, that claims 1–3, 5, 15–21, and 23 of the '875 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Rolf and MP3 Guide, and that claim 22 is

unpatentable under § 103(a) over the combination of Rolf, MP3 Guide, and OFDM/FM.

IV. ORDER

In consideration of the foregoing, it is

ORDERED that claims 1–3, 5, and 15–23 of the '875 patent have been shown to be unpatentable;

FURTHER ORDERED that the parties' respective motions to exclude evidence are *dismissed*; and

FURTHER ORDERED that, because this is a final written decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2014-01236
Patent 7,548,875 B2

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US007548875B2

(12) **United States Patent**
Mikkelsen et al.

(10) **Patent No.: US 7,548,875 B2**
(45) **Date of Patent: Jun. 16, 2009**

(54) **MEDIA DELIVERY PLATFORM**

(76) Inventors: **John Mikkelsen**, 212 SE. Second St., Suite 321, Minneapolis, MN (US) 55414; **Robert Freidson**, 25 Kamennoostrovsky Ave., Apt. 61, St. Petersburg (RU) 197101

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 215 days.

(21) Appl. No.: **10/183,756**

(22) Filed: **Jun. 26, 2002**

(65) **Prior Publication Data**

US 2003/0033214 A1 Feb. 13, 2003

Related U.S. Application Data

(60) Provisional application No. 60/343,159, filed on Oct. 26, 2001, provisional application No. 60/312,450, filed on Aug. 14, 2001, provisional application No. 60/303,115, filed on Jul. 3, 2001, provisional application No. 60/301,681, filed on Jun. 27, 2001.

(51) **Int. Cl.**
G06Q 30/00 (2006.01)

(52) **U.S. Cl.** **705/26**; 705/27

(58) **Field of Classification Search** 705/26–27; 700/94

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,446,334	A	5/1984	Gruff	179/81
5,481,599	A	1/1996	MacAllister et al.	379/101
5,629,867	A	5/1997	Goldman	364/514
5,664,111	A	9/1997	Nathan et al.	705/27
5,732,216	A	3/1998	Logan et al.	395/200.33
5,809,145	A *	9/1998	Slik et al.	705/52
5,884,262	A	3/1999	Wise et al.	704/270
5,918,213	A	6/1999	Bernard et al.	705/26
5,926,789	A	7/1999	Barbara et al.	704/275
5,949,411	A	9/1999	Doerr et al.	345/327
5,963,916	A	10/1999	Kaplan	705/26
6,044,089	A	3/2000	Ferriere	370/465
6,061,306	A	5/2000	Buchheim	369/2
6,112,103	A	8/2000	Puthuff	455/557
6,122,347	A	9/2000	Borland	379/70

(Continued)

FOREIGN PATENT DOCUMENTS

GB	2324935	*	11/1998

(Continued)

OTHER PUBLICATIONS

DRT: Ling, Connie; "Technology Journal—Sense of Site: Phone Fans Flock to Musical Web Sites," Asian Wall Street Journal, Apr. 24, 2000, p. T.2, Proquest #56075609, 3pgs.*

(Continued)

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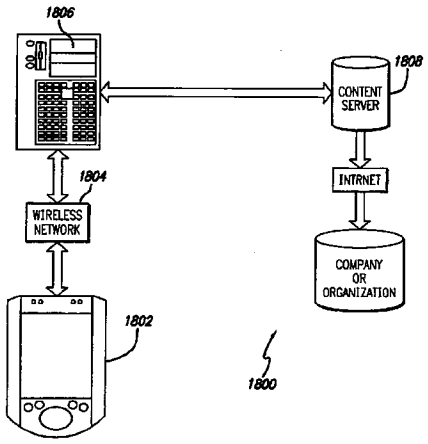
(57) **ABSTRACT**

A improved method for delivery and play back of sound and image files is provided, including the use of the files as alerts for various electronic devices or for playing on a handheld device. Algorithms are provided for the delivery, storage, and playback of sound files, including a delivery method algorithm, a parametric optimization and compression algorithm, and an error correction algorithm. The files may be selected from and downloaded to the electronic device with or without the use of a worldwide network connection.

23 Claims, 16 Drawing Sheets



U.S. PATENT DOCUMENTS

6,151,634	A	11/2000	Glaser et al.	709/236
6,167,251	A	12/2000	Segal et al.	455/406
6,173,316	B1 *	1/2001	De Boor et al.	709/218
6,178,230	B1	1/2001	Borland	379/67.1
6,247,130	B1	6/2001	Fritsch	713/171
6,253,122	B1	6/2001	Razavi et al.	701/1
6,282,270	B1	8/2001	Porter	379/88.17
6,291,756	B1	9/2001	Urbanek	84/477
6,301,339	B1	10/2001	Staples et al.	379/93.01
6,332,139	B1	12/2001	Kaneko et al.	707/6
6,335,973	B1	1/2002	Case	381/61
6,418,330	B1 *	7/2002	Lee	455/567
6,845,398	B1 *	1/2005	Galensky et al.	709/231
7,065,342	B1 *	6/2006	Rolf	455/412.1
2001/0000505	A1	4/2001	Segal et al.	455/407
2001/0009846	A1	7/2001	Loeuillet	455/90
2001/0014616	A1	8/2001	Matsuda et al.	455/567
2001/0024965	A1 *	9/2001	Hayashi	455/567
2001/0026609	A1	10/2001	Weinstein et al.	379/93.01
2001/0029192	A1	10/2001	Oh	455/556
2001/0034803	A1	10/2001	Sorek et al.	710/129
2001/0041588	A1	11/2001	Hollstrom et al.	455/556
2001/0043684	A1	11/2001	Guedalia et al.	379/88.17
2001/0044747	A1	11/2001	Ramachandran et al.	705/16
2001/0049262	A1	12/2001	Lehtonen	455/41
2001/0049566	A1	12/2001	Kim	700/94
2001/0050991	A1	12/2001	Eves	381/11
2001/0051926	A1	12/2001	Wang	705/51
2001/0055371	A1	12/2001	Baxter, Jr.	379/88.11
2002/0002035	A1	1/2002	Sim et al.	455/41
2002/0002627	A1	1/2002	Stead et al.	709/250
2002/0010740	A1	1/2002	Kikuchi et al.	709/203
2002/0026867	A1	3/2002	Hasegawa et al.	84/609
2002/0106074	A1	8/2002	Elliott	379/372
2002/0175665	A1 *	11/2002	O'Grady et al.	323/371
2004/0214551	A1 *	10/2004	Kim	455/412.1
2006/0168451	A1	7/2006	Ishibashi et al.	

FOREIGN PATENT DOCUMENTS

WO	WO 01/39476 A1	5/2001

OTHER PUBLICATIONS

DRT: Greenman, Catherine; "Personalize Your Cell Phone By Using the Sound of Music," Houston Chronicle, Apr. 28, 2000, p. 6, Proquest #53115394, 3pgs.*

Woody, Jerome; "Favorite Tunes are a Download Away," Syracuse Herald Journal, Aug. 5, 1999, p. 9, Proquest #43720095 3pgs.*

Majidimehr et al.; "Delivering Compressed Multimedia," Electronic Engineering Times, Nov. 22, 1999, n1088 p. 72, Proquest #46780967, 3pgs.*

Ling, Connie; "Ring my bell: Mobile phones that jingle . . . that ring their favorite tunes," Asian Wall Street Journal, Jun. 22, 1998, Proquest #30338788, 4pgs.*

Chen, James; "IEEE 802.11a—speeding up wireless connectivity in the home," Communication Systems Design, Feb. 2001, Proquest # 68587621, 8pgs.*

Breen, Christopher; "Professional audio tools," Macworld, Sep. 1998; v15i9pg59, Proquest #32528807, 3pgs.*

Amazon.Com web page [online] [retrieved on Jul. 31, 2002] Retrieved from Internet: http://www.amazon.com/exec/obidos/tg/browse/-/5174/ref=gw_br_mu/103-8907110-3440637http://www.amazon.com/exec/obidos/tg/browse/-/5174/ref=gw_br_mu/103-8907110-3440637.

Linden deCarmo, PC Magazine "Solutions, Tools and Tips For The Internet Age"—Issue Date Jun. 26, 2001, 3 pages.

Web pages of Interactive Week: Interview: Thomas Dolby Goes Mobile- Issue Date Mar. 1, 2001, 4 pages.

John C. Dvorak, PC Magazine, "Inside"—Issue Date May 22, 2001, 1 page.

Steve Lohr, The New York Times, Nokia to Join With I.B.M. I n 2 Ventures on Software, Issue Date Jul. 9, 2002.

Nokia Cellular Phones [online] [retrieved on Jul. 31, 2002] Retrieved from the Internet:http://www.nokia.com.

* cited by examiner

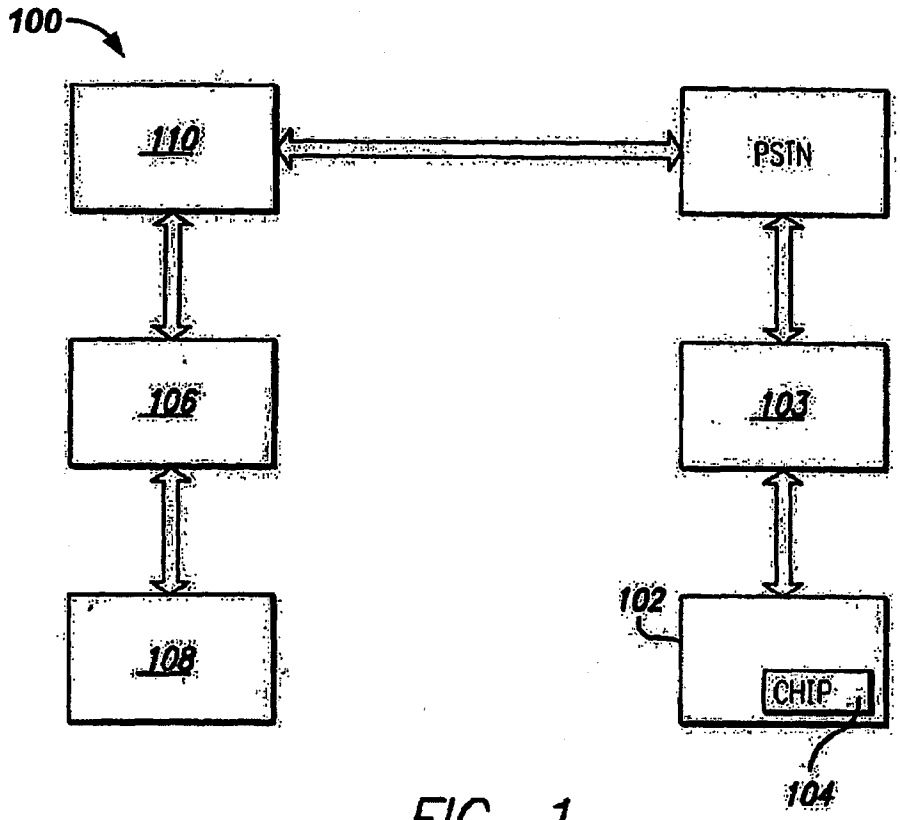

100
110
PSTN
106
103
102
108
CHIP
104

FIG. 1

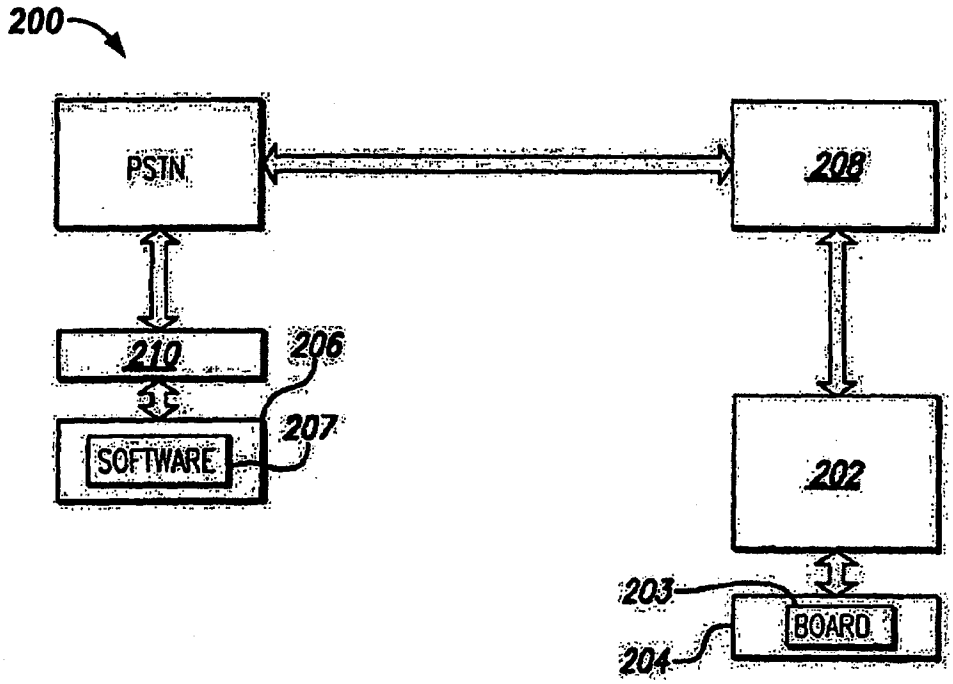

200
PSTN
208
210
206
207
SOFTWARE
202
203
BOARD
204

FIG. 2

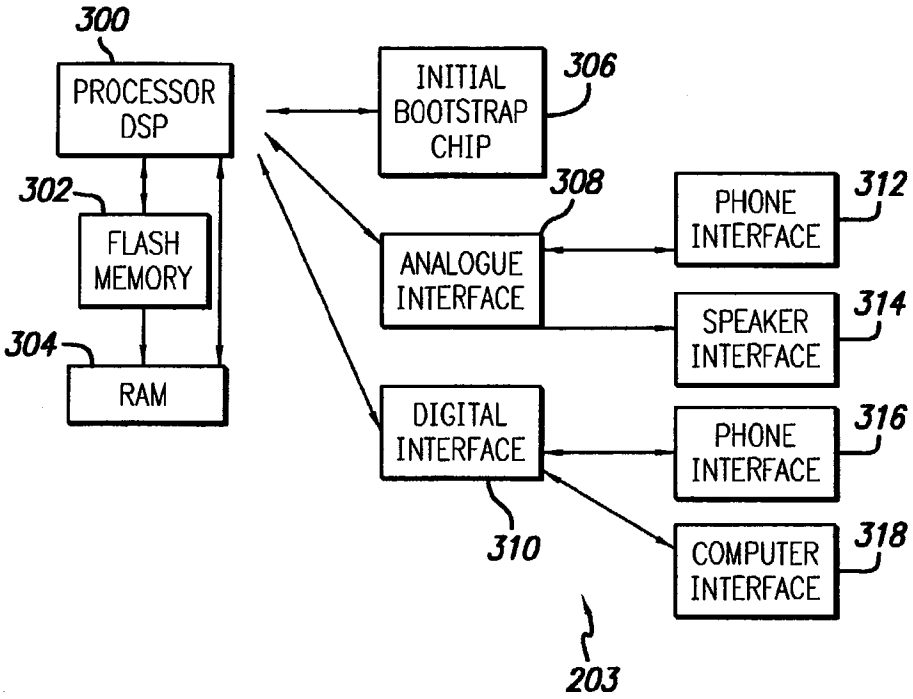

300
PROCESSOR DSP
302
FLASH MEMORY
304
RAM
INITIAL BOOTSTRAP CHIP
306
308
ANALOGUE INTERFACE
DIGITAL INTERFACE
310
PHONE INTERFACE
312
SPEAKER INTERFACE
314
PHONE INTERFACE
316
COMPUTER INTERFACE
318
203

FIG. 3

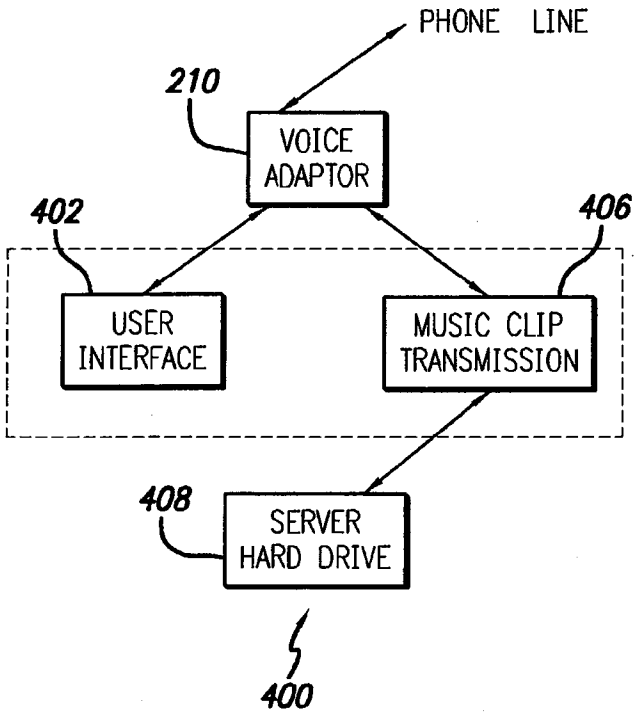

PHONE LINE
210
VOICE ADAPTOR
402
406
USER INTERFACE
MUSIC CLIP TRANSMISSION
408
SERVER HARD DRIVE
400

FIG. 4

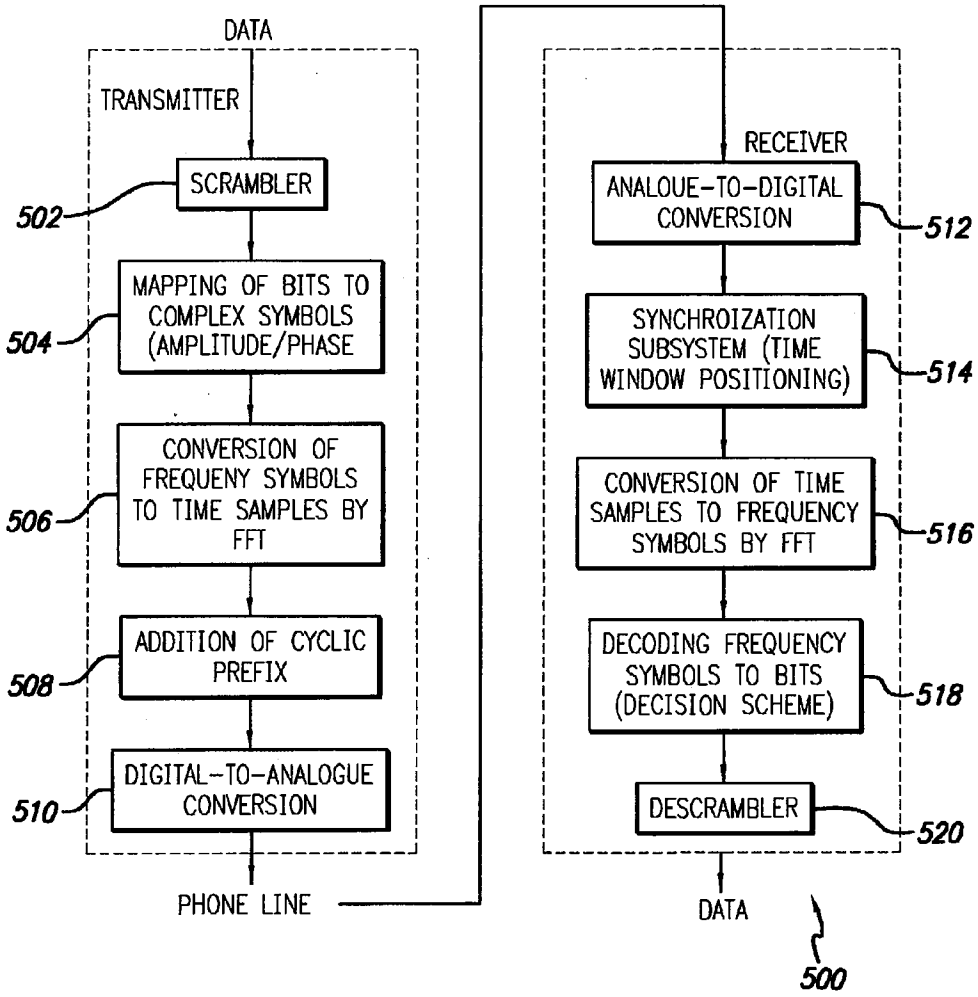

DATA
TRANSMITTER
SCRAMBLER
502
MAPPING OF BITS TO COMPLEX SYMBOLS (AMPLITUDE/PHASE
504
CONVERSION OF FREQUENY SYMBOLS TO TIME SAMPLES BY FFT
506
ADDITION OF CYCLIC PREFIX
508
DIGITAL-TO-ANALOGUE CONVERSION
510
PHONE LINE
RECEIVER
ANALOUE-TO-DIGITAL CONVERSION
512
SYNCHROIZATION SUBSYSTEM (TIME WINDOW POSITIONING)
514
CONVERSION OF TIME SAMPLES TO FREQUENCY SYMBOLS BY FFT
516
DECODING FREQUENCY SYMBOLS TO BITS (DECISION SCHEME)
518
DESCRAMBLER
520
DATA
500

FIG. 5

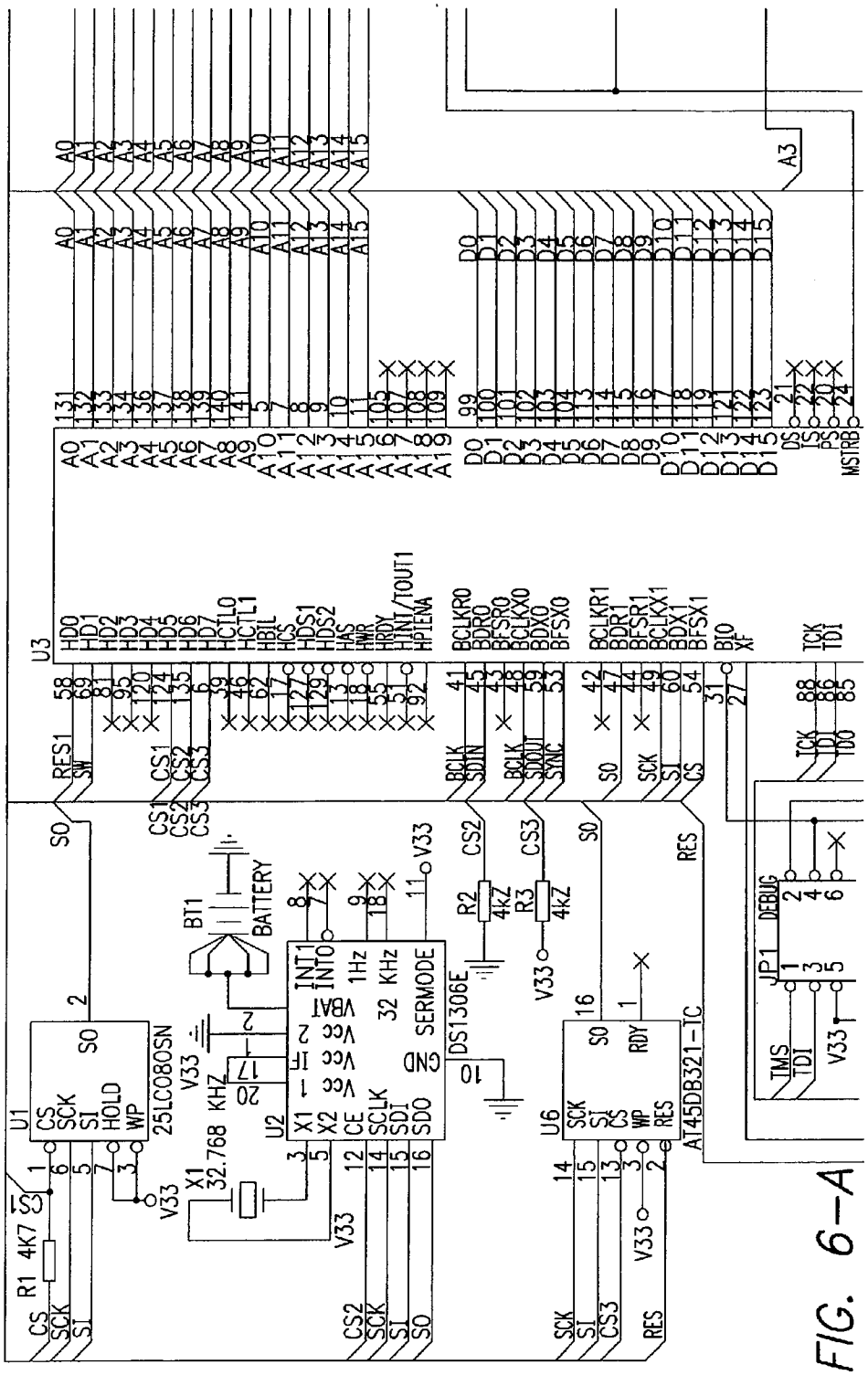

U3
U1
U2
U6
BT1
BATTERY
X1
32.768 KHZ
DS1306E
SERMODE
25LC080SN
A145DB321-TC
JP1
DEBUG
R1 4K7
R2 4kZ
R3 4kZ
V33
A3
TMS
TDI
TCK
TDO

FIG. 6-A

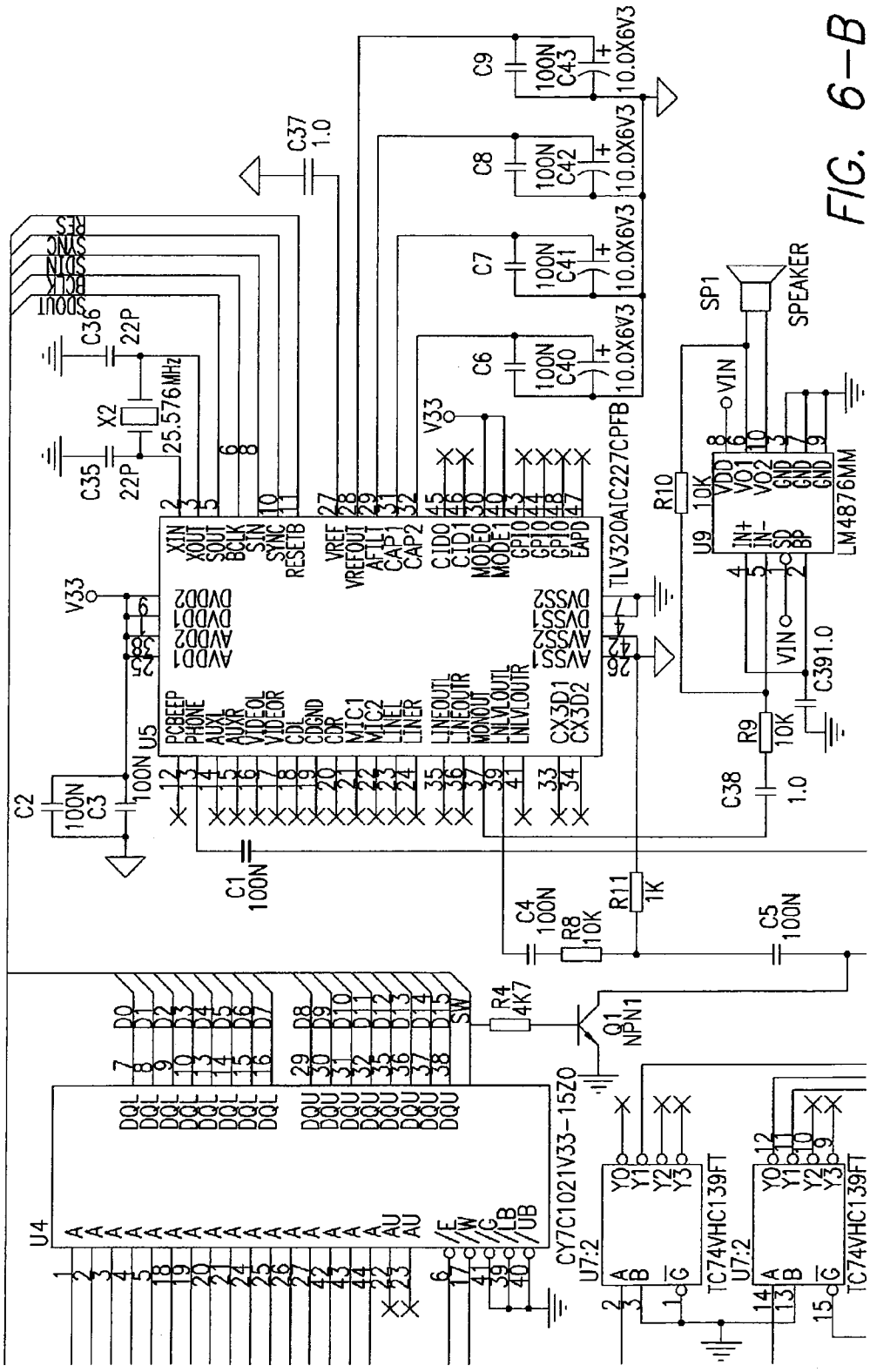

TLV320AIC227CPFB
U5
CY7C1021V33-15ZO
U4
TC74VHC139FT
U7:2
LM4876MM
U9
SPEAKER
SP1
Q1
NPN1
V33
VIN
25.576MHz
X2
C1
C2
C3
C4
C5
C6
C7
C8
C9
C35
C36
C37
C38
C391.0
R4
R8
R9
R10
R11

FIG. 6-B

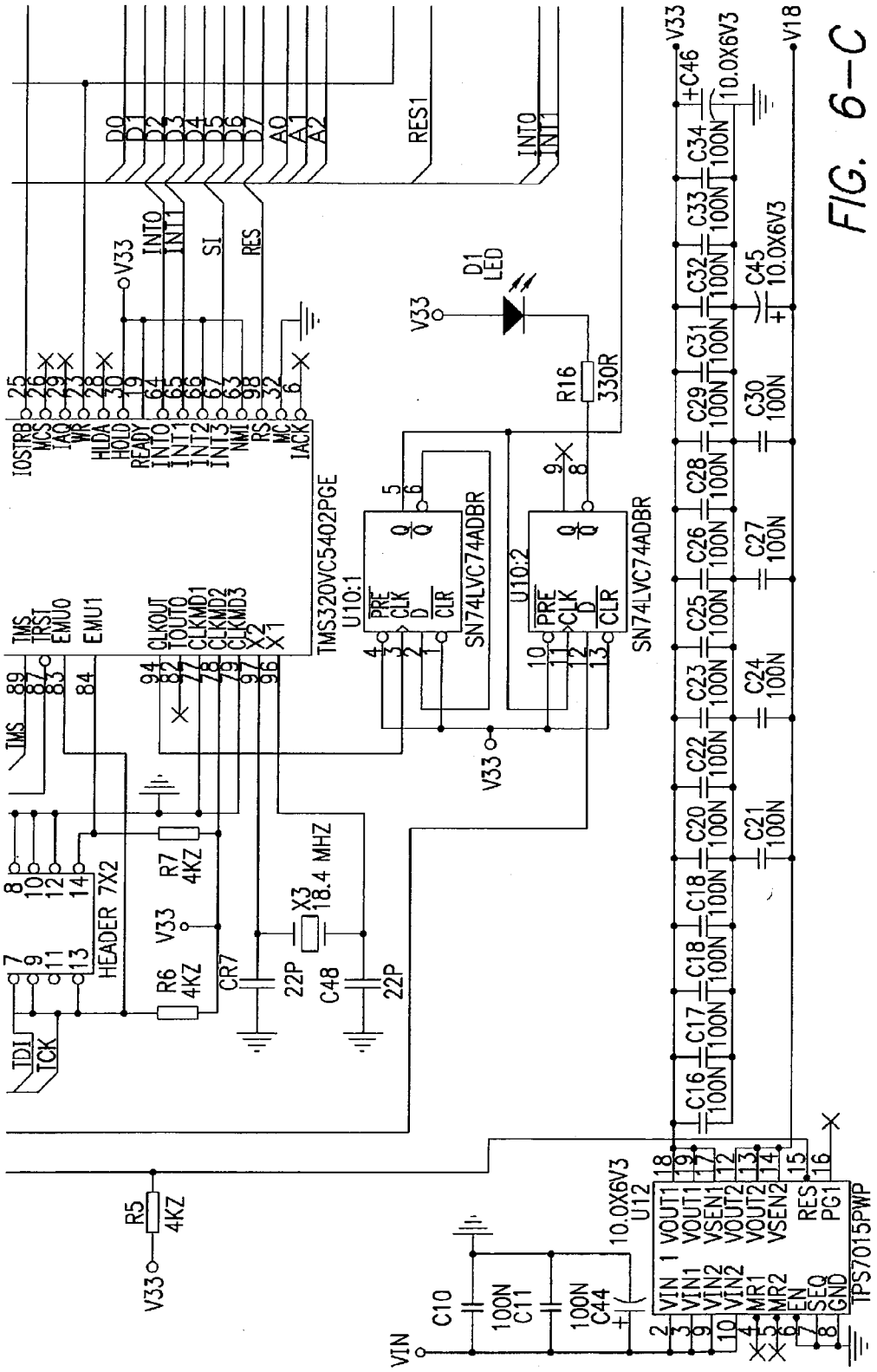
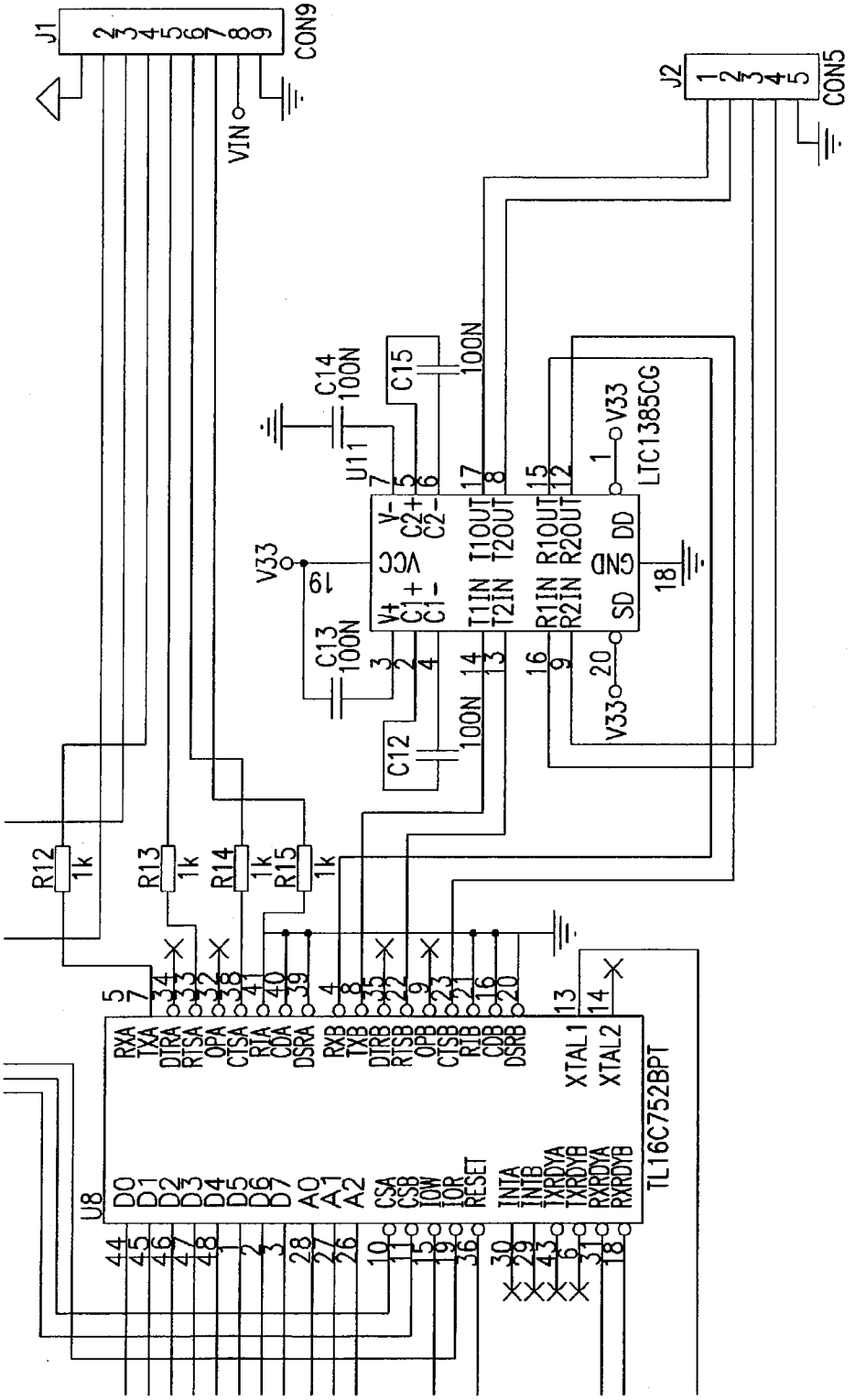

TMS320VC5402PGE
U10:1
U10:2
SN74LVC74ADBR
SN74LVC74ADBR
TPS7015PWP
U12
HEADER 7X2
X3
18.4 MHZ
D1
LED
R16
330R
R5
4KZ
R6
4KZ
R7
4KZ
CR7
22P
C48
22P
C10
100N
C11
100N
C44
10.0X6V3
C45
10.0X6V3
C46
10.0X6V3
V33
V18
VIN
RES1
INT0
INT1
IOSTRB
MCS
IAQ
WR
HLDA
HOLD
READY
INT0
INT1
INT2
INT3
NMI
RS
MC
IACK
TMS
TRST
EMU0
EMU1
CLKOUT
TOUT0
CLKMD1
CLKMD2
CLKMD3
X2
X1
TDI
TCK
D0
D1
D2
D3
D4
D5
D6
D7
A0
A1
A2
SI
RES

FIG. 6-C

FIG. 6-D


J1
CON9
VIN
J2
CON5
C14
100N
C15
100N
U11
LTC1385CG
V33
C13
100N
C12
100N
R12
1k
R13
1k
R14
1k
R15
1k
U8
TL16C752BPT
XTAL1
XTAL2

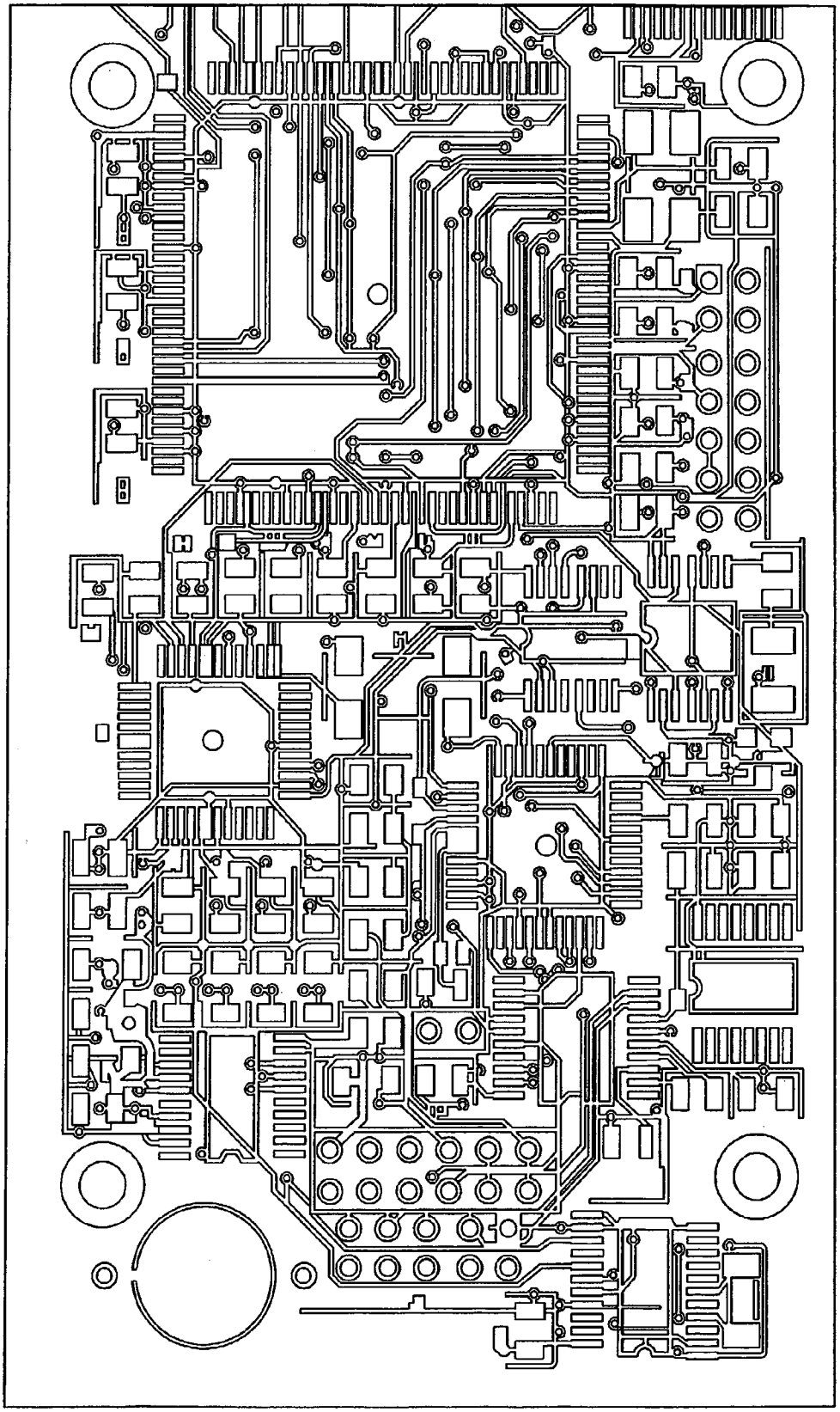


FIG. 7

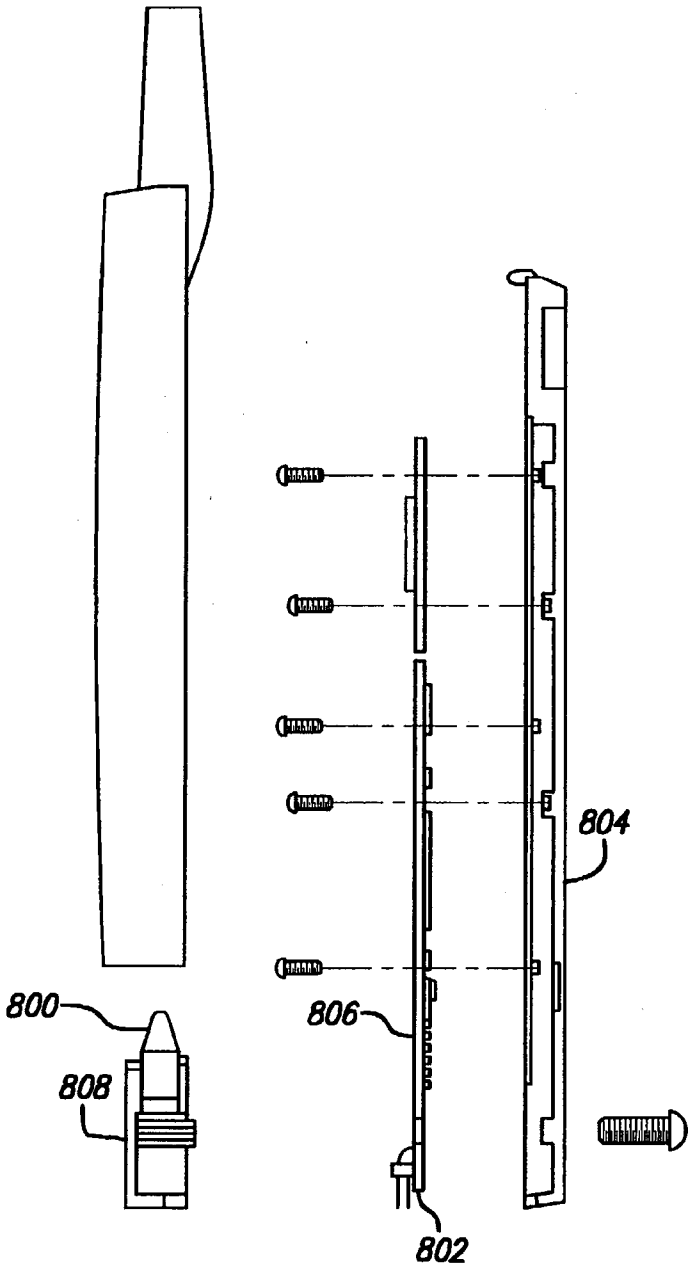


FIG. 8

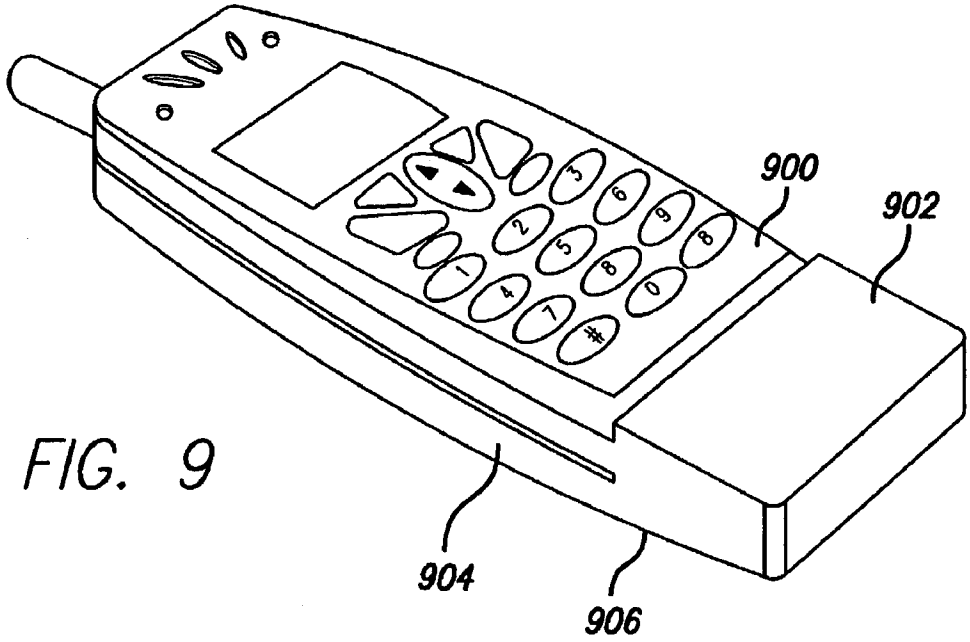


FIG. 9

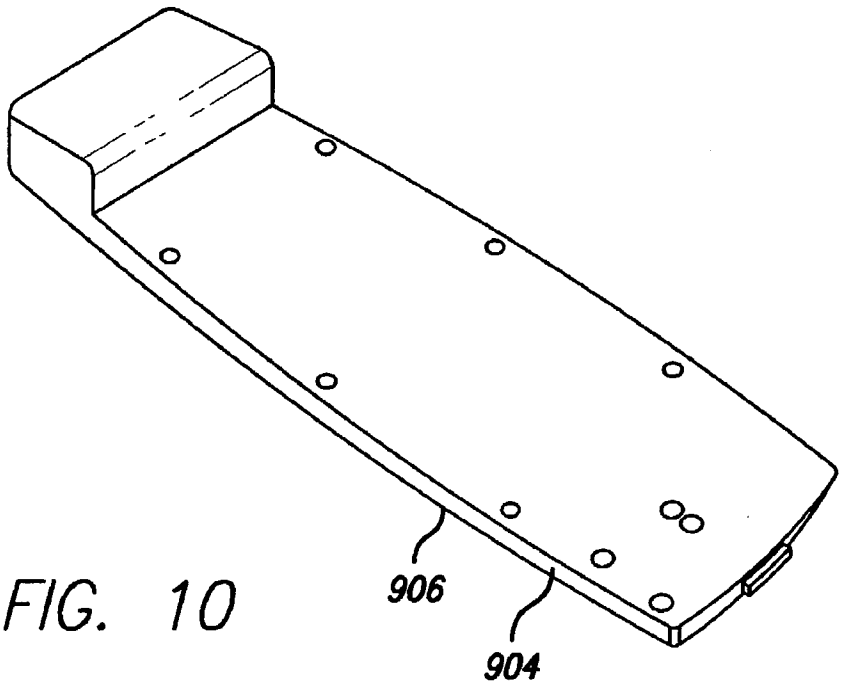
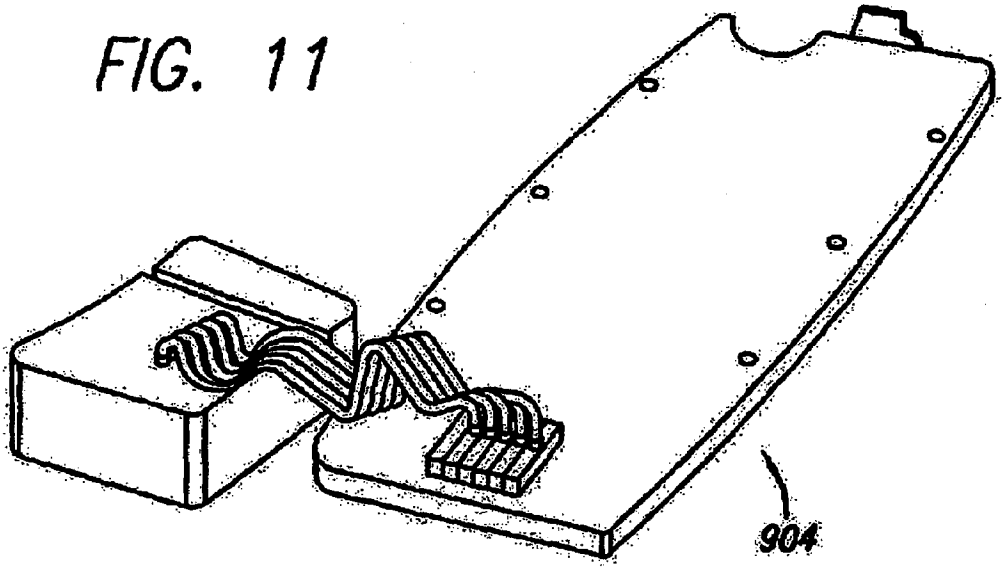


FIG. 10

FIG. 11


904

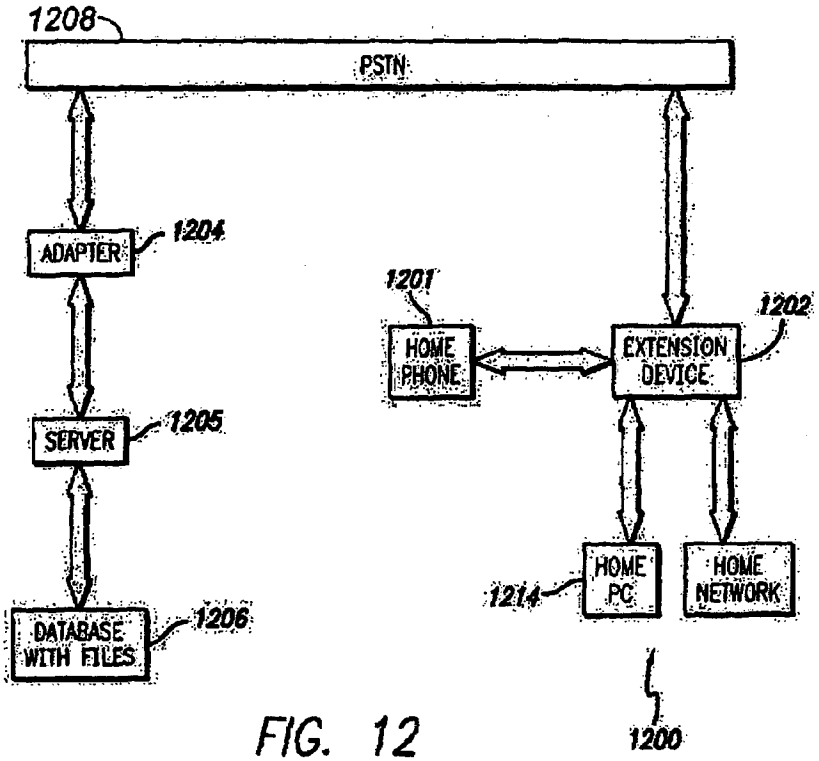

1208
PSTN
ADAPTER
1204
SERVER
1205
DATABASE WITH FILES
1206
1201
HOME PHONE
1202
EXTENSION DEVICE
HOME PC
1214
HOME NETWORK
1200

FIG. 12

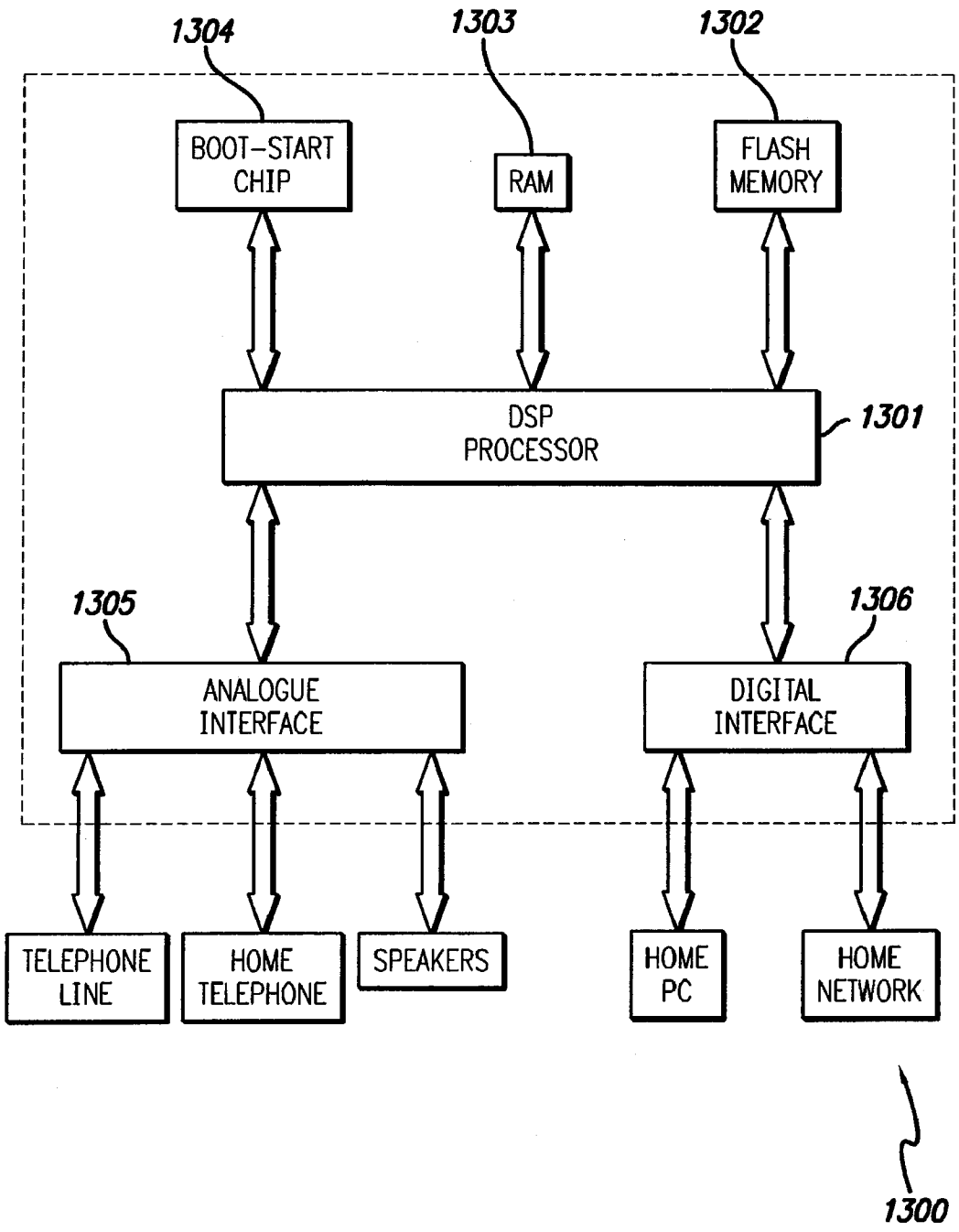

1304
1303
1302
BOOT–START CHIP
RAM
FLASH MEMORY
DSP PROCESSOR
1301
1305
1306
ANALOGUE INTERFACE
DIGITAL INTERFACE
TELEPHONE LINE
HOME TELEPHONE
SPEAKERS
HOME PC
HOME NETWORK
1300

FIG. 13

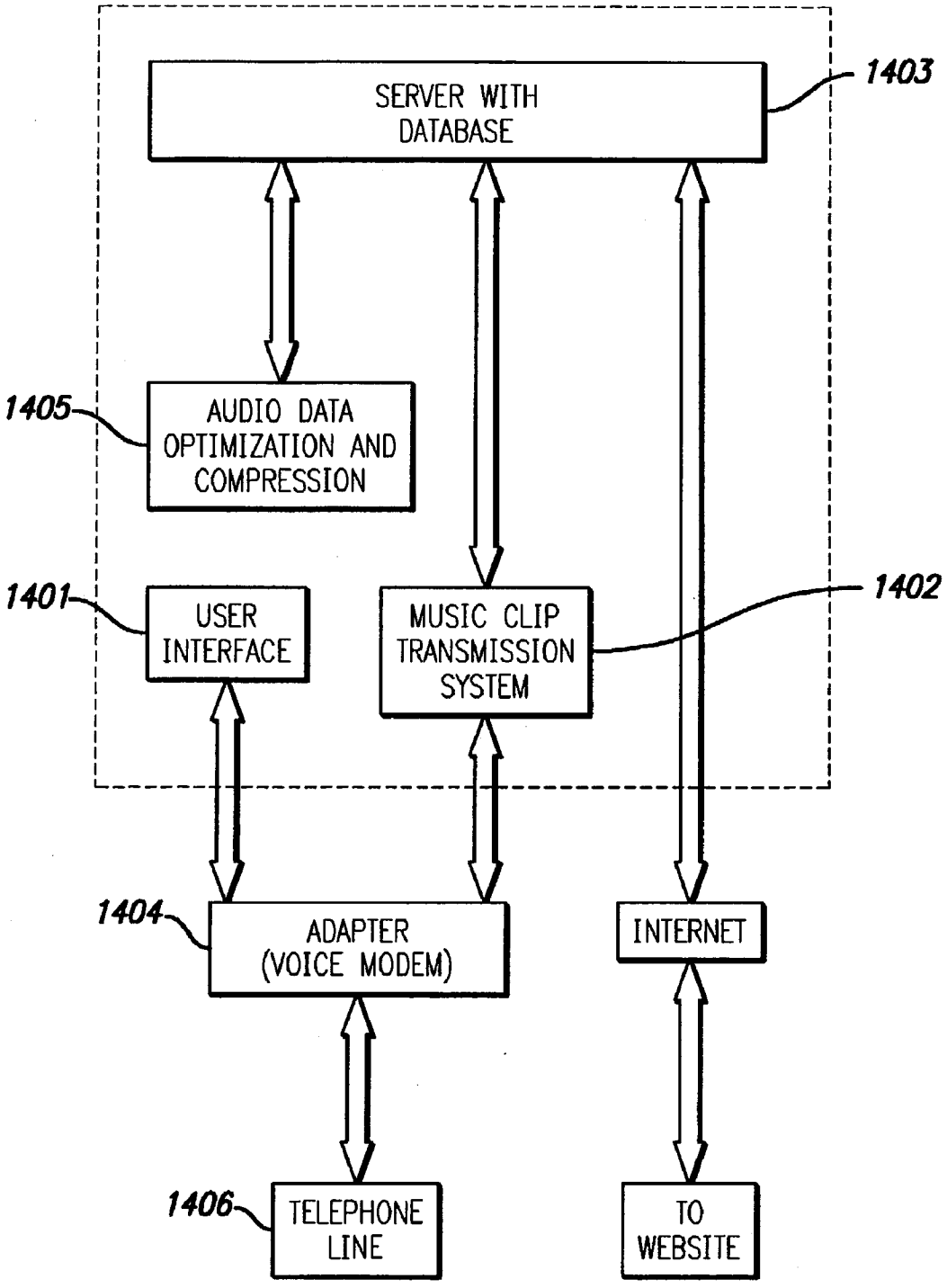

SERVER WITH DATABASE
1403
AUDIO DATA OPTIMIZATION AND COMPRESSION
1405
USER INTERFACE
1401
MUSIC CLIP TRANSMISSION SYSTEM
1402
ADAPTER (VOICE MODEM)
1404
INTERNET
TELEPHONE LINE
1406
TO WEBSITE

FIG. 14

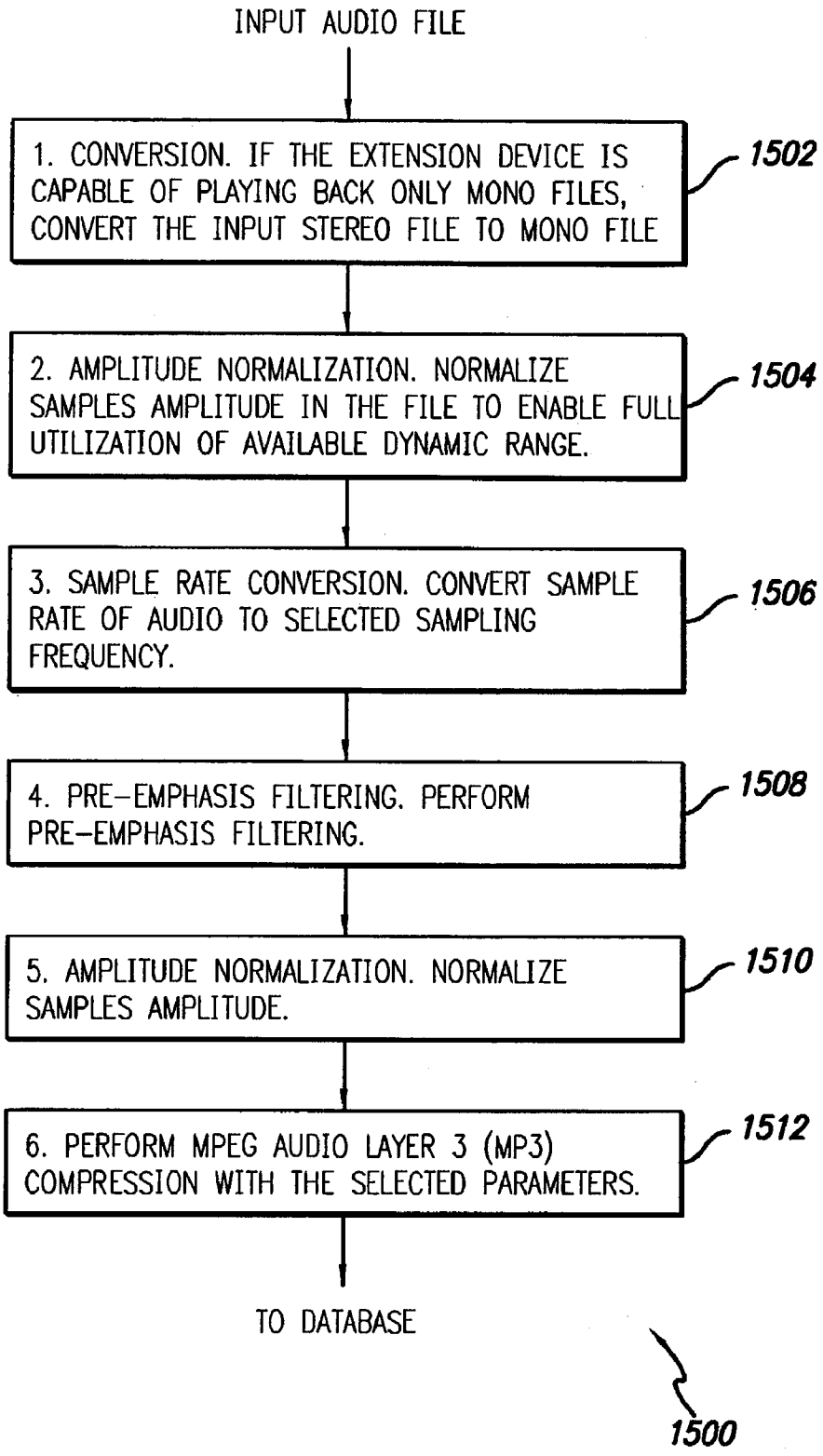

INPUT AUDIO FILE
1. CONVERSION. IF THE EXTENSION DEVICE IS CAPABLE OF PLAYING BACK ONLY MONO FILES, CONVERT THE INPUT STEREO FILE TO MONO FILE
1502
2. AMPLITUDE NORMALIZATION. NORMALIZE SAMPLES AMPLITUDE IN THE FILE TO ENABLE FULL UTILIZATION OF AVAILABLE DYNAMIC RANGE.
1504
3. SAMPLE RATE CONVERSION. CONVERT SAMPLE RATE OF AUDIO TO SELECTED SAMPLING FREQUENCY.
1506
4. PRE-EMPHASIS FILTERING. PERFORM PRE-EMPHASIS FILTERING.
1508
5. AMPLITUDE NORMALIZATION. NORMALIZE SAMPLES AMPLITUDE.
1510
6. PERFORM MPEG AUDIO LAYER 3 (MP3) COMPRESSION WITH THE SELECTED PARAMETERS.
1512
TO DATABASE
1500

FIG. 15

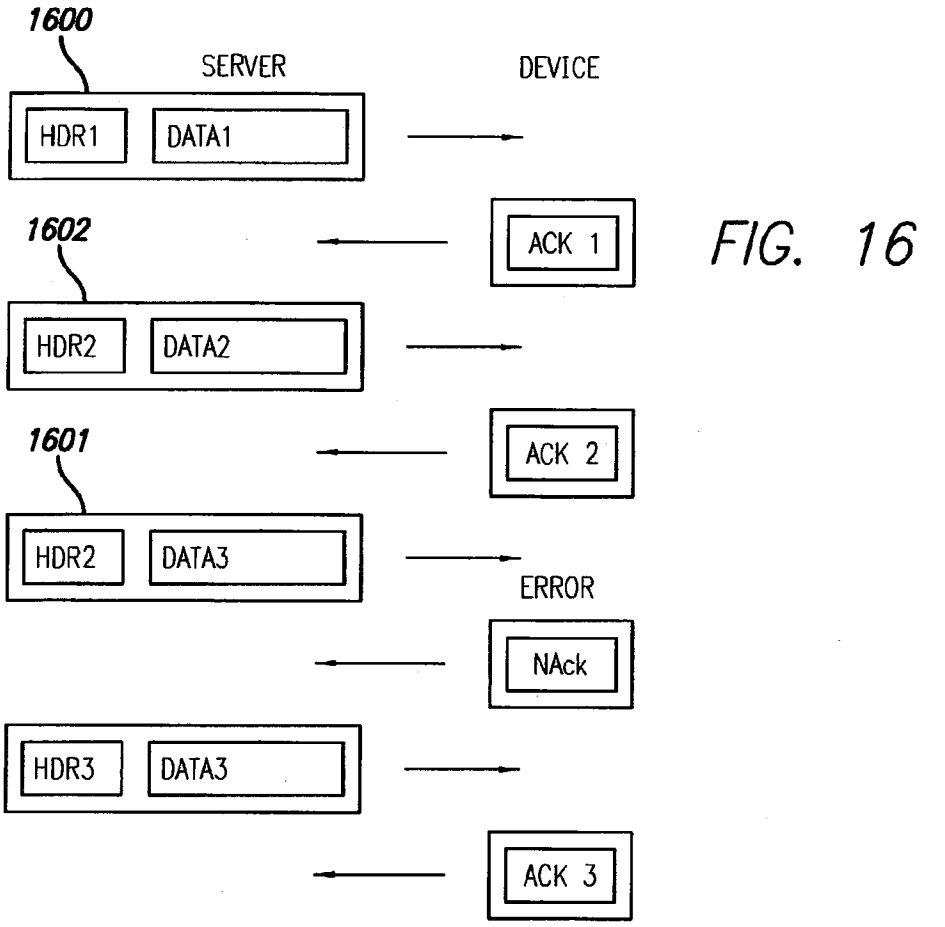

1600
SERVER
DEVICE
HDR1
DATA1
ACK 1
1602
HDR2
DATA2
ACK 2
1601
HDR2
DATA3
ERROR
NAck
HDR3
DATA3
ACK 3

FIG. 16

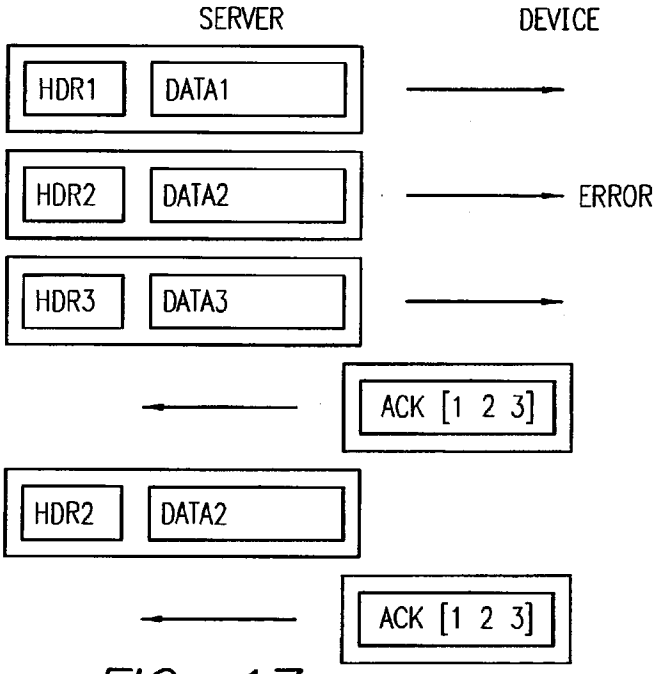

SERVER
DEVICE
HDR1
DATA1
HDR2
DATA2
ERROR
HDR3
DATA3
ACK [1 2 3]
HDR2
DATA2
ACK [1 2 3]

FIG. 17

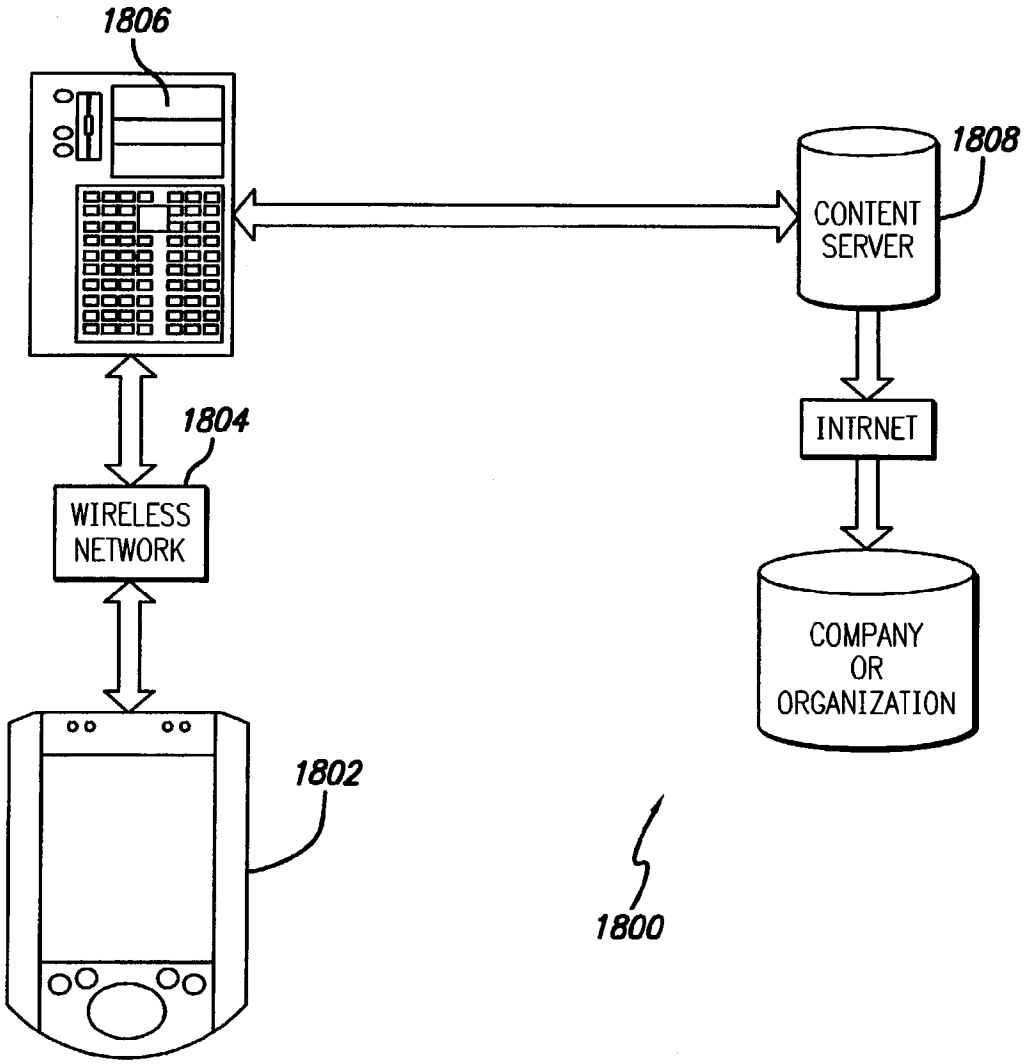

1806
1808
CONTENT SERVER
1804
INTRNET
WIRELESS NETWORK
COMPANY OR ORGANIZATION
1802
1800

FIG. 18

MEDIA DELIVERY PLATFORM

CROSS-REFERENCES TO RELATED APPLICATIONS

This is a continuation application claiming priority from U.S. Provisional Application Ser. No. 60/301,681 filed on Jun. 27, 2001, U.S. Provisional Application Ser. No. 60/303,115 filed on Jul. 3, 2001, U.S. Provisional Application Ser. No. 60/312,450 filed on Aug. 14, 2001, and U.S. Provisional Application Ser. No. 60/343,159 filed Oct. 26, 2001, all of which applications are incorporated herein by this reference thereto.

TECHNICAL FIELD

This invention relates to a method of delivery and play back of sound and image files for wireless and non-wireless electronic devices.

BACKGROUND ART

The general concept for delivery of sound recordings or clips and visual recordings or clips by way of the Internet is known and described in various U.S. patent applications. (See Bernard et al., U.S. Pat. No. 5,918,213; Kaplan, U.S. Pat. No. 5,963,916; Barbara, U.S. Pat. No. 5,926,789; and Doerr et al., U.S. Pat. No. 5,949,41.) Such methods are typically used to sell products to consumers. For example, a web page from Amazon.com allows a user to listen to samples of music for before purchasing compact discs (CD's) by mail.

Also, cell phones may be programmed to ring with a tune of a song or musical composition, and have become increasingly popular. However, cellular phones currently on the market can only be either programmed to only play music (such as conventional MP3 type phones) or to deliver "ring tones" with an electronic chime or ring tone rather than an actual recorded song, human voice, or musical composition. Additionally, these ring tones must be factory installed in the telephone or the delivery methods just directly interface with the Internet and require the consumer to be on line to access and download a particular mechanical ring tone.

At the same time, various methods have been developed and are being used to enable a phone user to make more effective use of the variety of telephone service now available. For example, "caller ID" function is one such feature which allows the recipient of an incoming call to identify the caller based on textual information provided on a telephone display panel. A patent to Borland, U.S. Pat. No. 6,178,230 discloses an improved telephone system and method that determines the identity of the person being called for a telephone having more than one user and can identify the person being called by sounding a distinctive ring associated with the person being called. A mechanical ring tone is played depending upon the caller ID signal received to orally alert the telephone user as to who is calling without reading the telephone's display panel.

DISCLOSURE OF INVENTION

The present invention provides an improved method for delivery and play back of sound and image files which include songs, musical compositions, and other sound recordings cartoons, movies, television shows, or any other type of performance, which may be copyright registered, as well as non copyright registered personal recordings (e.g., personal sound recordings, family photos, home movies, etc.). This

new method includes the use of sound and/or image clips, which can be snippets or full files, as alerts for a variety of electronic devices or for playing on a handheld device. A collection or library of uniquely selected and/or edited clips may also be provided to the consumer in a manner far more conveniently on conventional telephone equipment than previously available.

The method provides the consumer with a unique way of accessing and browsing through selectable files which may be Internet based or independent of the Internet. Additionally, the unique delivery method provides a seller or service provider with a convenient and more efficient way of promoting and selling entire sound and image files which include downloadable music, movies, films, shows, and items such as records, cassette tapes, CDs, videos, and DVDs.

Algorithms are provided for the delivery, storage and playback of the sound files, including a delivery method algorithm, a parametric optimization and compression algorithm, and an error correction algorithm.

According to one embodiment, sound files are accessed by a cellular or landline telephone for allowing the consumer to browse, download, hear and/ or purchase sound files or use sound files including sound clips as ringer sounds. In contrast to the conventional ring tones or musical chimes used to ring cellular phones currently on the market, the current invention provides a method for ringing cellular phones (both analogue and digital) and landline telephones with real sound recordings including real music, which may be songs lifted from copyright registered CD tracks, and may comprise human voice, various instrument sounds, and other sound effects of a high quality. Instead of simply tones being played the higher fidelity musical composition can be played by the telephone or other handset with a degree of fidelity previously unavailable using conventional methods. The high degree of fidelity is achieved using data compression, error correction and parametric optimization algorithms adaptable to conventional telephones and other handheld devices.

A software based system for encoding the hardware of existing cellular phones at the time of manufacturing with delivery, storage, and playback capabilities in accordance with the present invention is provided, such that additional hardware is not required. (Only a suitable speaker need be required with most telephones already possessing the necessary quality of speaker.) The ability to provide this technology without the need for extra hardware is very significant, particularly to the cellular phone industry, as it is especially desirable to make cellular phones as lightweight and as small as possible and at the lowest cost.

An accessory attachment to standard telephones can however be incorporated to implement the delivery, storage, and playback capabilities of the present invention to existing landline and cellular telephones which have not been encoded at the time of their manufacture, if necessary. Such accessory attachments are compatible with existing telephones, and may be sold separately. Also, a micro chip may be embedded in landline telephones for providing the telephone with browsing, delivery, storage, and playback capabilities of the present invention.

The accessory attachment or telephone encoded with software and/or including hardware for providing delivery, storage, and playback capabilities as described herein, may be manufactured with embedded sound files including sound clips, such that a user can immediately play back the files, including use the files as ringer sounds, without having to first download any files.

Additionally, upon hearing a sound clip on the telephone, a user may choose to download the entire unedited sound file

for a fee or purchase an item associated with the sound clip (e.g., record, cassette tape, CD, video, or DVD) by pressing a designated button on the accessory attachment or keys on the telephone keypad. As such, sound clips which have been downloaded to, or preprogrammed on a cell phone, may encourage and stimulate the sale of downloadable files and/or items associated with the clips by allowing the user to make an impulsive purchase immediately upon hearing the clips.

The accessing of sound and/or image files by other electronic devices, such as home phones, computers, pagers, doorbells, alarms, palm pilots, watches, clocks, PDAs etc., for either allowing the consumer to browse, download, hear, view, and/or purchase sound recordings, image files, or associated items, or to use sound and/or image clips as alerts is also part of the invention and not limited to solely telephones. New electronic devices, whose independent purpose is to allow the user to browse, receive, store and play sound and image files, including clips, according to the present invention are also described.

A security feature may be included on such electronic devices adapted for allowing a consumer to access and use sound and image files according to the present invention. This feature is designed to prevent intellectual property abuse by consumers' unauthorized dissemination and reproduction of copyright protected material. The downloaded chips or recordings are coded and cannot be downloadable or transferred to units other than the consumers' preselected layer or telephone.

Also, a tracking feature for keeping a record of every song downloaded and/or each time a song is played can be incorporated for providing performing rights organizations or songwriters' organizations with an accurate method for determining royalty payments to writers and performers of music.

Additionally, a website suitable for viewing and selecting downloading sound and/or image clips or entire files may be used for giving the consumer and music or image seller a unique way of transacting the sale of such files or other associated items such as records, cassette tapes, CD's, videos, or DVD's. The website may allow the clips to be stored on a user's computer, providing the user the ability to readily access the clips for downloading the clips to an electronic devise, using the clips as computer alerts, or playing the clips on the computer. The user may also purchase files or items associated with the clips through the computer and/or website.

The system of the present invention may also allow the consumer to browse through hundreds or thousands of sound and/or image clips and/or files for the purpose of downloading to electronic devices with an option to purchase an associated record, cassette tape, CD, video or DVD, or download the full unclipped sound and/or image file.

Furthermore, the delivery of files including clips is not limited to web based applications. Unlike conventional methods which require computer plug-in devices for delivering and transferring digital music, the current invention may use a delivery method which allows the user to browse, download, and listen to or watch sound or image files without the need for hand wired plug-in devices or a computer connection to the Internet.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a general schematic diagram illustrating the basic components of a wireless transmission system for a landline or cellular telephone.

FIG. **2** is a schematic diagram of a wireless transmission system for a cellular phone.

FIG. **3** is a schematic diagram of a board system implemented in an accessory unit of the system of FIG. **2**.

FIG. **4** is a schematic diagram of a server software system for the system of FIG. **2**.

FIG. **5** is a flow chart illustrating a data transmission method.

FIGS. **6**A–D illustrate the electrical schematics of a mobile telephone accessory unit in accordance with the present invention.

FIG. **7** illustrates an image of a printed circuit board for the accessory unit of FIGS. **6** A–D.

FIG. **8** is an exploded side view illustrating the assembly of a cellular phone accessory unit and cellular phone attachment to the accessory unit.

FIG. **9** is a perspective view of the cellular phone accessory unit and cellular phone of FIG. **8**, showing the cellular phone attached to the back of the phone connector and mounting of the accessory unit.

FIG. **10** is a perspective view of the accessory unit of FIG. **9**, detached from the telephone.

FIG. **11** is a picture of the accessory unit of FIG. **9**, disassembled from the mounting.

FIG. **12** is a schematic diagram of a landline transmission system for a home telephone.

FIG. **13** is a schematic diagram of a board system implemented in an accessory unit of a home telephone utilizing the system of FIG. **12**.

FIG. **14** is a schematic diagram of server software for the system of FIG. **12**.

FIG. **15** is a flow chart for an audio data parametric optimization and compression algorithm.

FIG. **16** is a schematic diagram of a protocol for a data transmission method with error correction delivery for a digital cellular telephone, illustrating individual packet acknowledgement for a full-duplex channel case.

FIG. **17** is a schematic diagram of a protocol for a data transmission method with error correction delivery for a digital cellular telephone, illustrating single acknowledgement for all packets for a half-duplex channel case.

FIG. **18** is a schematic diagram for a media file monitoring system.

MODE(S) FOR CARRYING OUT THE INVENTION

The detailed description set forth below in connection with the appended drawings is intended as a description of presently-preferred embodiments of the invention and is not intended to represent the only forms in which the present invention may be constructed and/or utilized. The description sets forth the functions and the sequence of steps for constructing and operating the invention in connection with the illustrated embodiments. However, it is to be understood that the same or equivalent functions and sequences may be accomplished by different embodiments that are also intended to be encompassed within the spirit and scope of the invention.

The present invention uses a unique method for delivery, storage, and play back of sound and image files which include songs, musical compositions, or other sound recordings, cartoons, movies, television shows, or any other type of performance, as well as personal clips (e.g., personal sound recordings, family photos, home movies, etc.). This method includes the use of sound and or image clips as alerts for a variety of electronic equipment, and provides the consumer with a unique way of accessing these files which may be Internet based or independent of the Internet.

The present invention may include a number of modules for an overall system of delivery of music and audio/visual files. These modules include a server of the files accessible by way of a specialized website for viewing, selecting, sampling and downloading selected files or portions thereof or directly accessible without going through a website. A telephone, be it conventional, cell phone or other hand held device with access to a communication network can access the server either directly or through the website. Special algorithms allow the transfer of the files to the handset providing the high gravity recording in a file formal which allows for tracking and security against unauthorized reproduction. The individual elements of the invention are unique as well as the overall system of delivery tracking and security. Described below are more detail aspects of the invention and its use.

Use of Sound and/or Image Clips as Alerts for Electronic Devices

According to one embodiment the system allows for sound and/or image clips which are snippets of a musical and/or visual performance piece to be used for sound and/or image alerts in electronic devices. A library or collection of uniquely edited clips may be provided to the consumer for browsing and selecting files to be stored on the electronic device. The consumer may also use home made personal clips (e.g. personal sound recordings, family photos, home movies, etc.).

The sound and/or image clips may be lifted from CD's, movies, TV shows, and the like, and are actual recordings, which may include human voice, instrument sound, and other sound effects, rather than mere electronic chimes or tones as those produced by conventional cellular phones. Electronic devices which may utilize sound and/or image clips as alerts include, but are not limited to cellular phones, land line phones, computers, clocks, watches, pagers, door bells, car alarms, palm pilots, and personal calendars. It should be understood that although using clips for alerts is preferable, full unedited files may also be used.

According to one embodiment, real music sound clips are used to "ring" a cellular or home phone. A clip or series of clips, which the user can select, are played instead of the conventional electronic chime or ring tone. Such a system may be implemented on conventional cellular phones, which may be analogue or digital, by downloading firmwear comprising algorithms for delivery, storage, and playback of the sound files, to the RAM element of the phone. Such algorithms include a delivery method algorithm, a parametric optimization and compression algorithm, and an error correction algorithm. Alternatively, an accessory unit that attaches to the cellular phone for implementing the system of the present invention may be provided.

According to another embodiment, sound and/or image clips are used for computer alerts such as e-mail notification sounds. Clips may also be used to ring a doorbell. Sound clips may further be used by a clock or watch to sound at the beginning of each hour, similar to a grandfather clock, wherein a different sound clip may be played at each hour.

The present invention allows the user to store hundreds of different alert clips on a device. Unlike conventional electronic equipment which hold a limited number of selectable alerts, such as a conventional car alarm or music player alarm clock, the present invention allows the user to choose from an unlimited number of clip files including allowing the user to create his own alert clips or to choose from a library of uniquely selected and/or edited files, including samples taken from CD's, movies, television shows and the like.

A cellular phone, or similar device (having a processor, RAM, and flash elements) may be integrated with software at the time of manufacturing for implementing the system of the present invention. Alternatively, a chip may be embedded into the device or an accessory unit, including a speaker, which attached to the device for implementing the system of the present invention may be provided. The accessory unit may have an adapter connection to the device. Such accessory unit may be sold with several adapter outlets to enable it to fit onto a variety of different electronic devices.

Sound and/or image clips may be pre-stored on the electronic device or accessory unit at the time of manufacturing, such that the consumer may be able to used the clips for alerts, without first having to select and download clips.

A user of an electronic device, according to the present invention, may download and store a number of clips off of a website via a plug-in connection of the device to the computer, or via a wireless network system such as the Apple® Airport. Additionally, a non-Internet based holding system, which may be especially adapted for delivering clips to the electronic device or accessory unit may also be provided. Such holding system may be accessed via a phone dial in connection wherein a user may interact with the holding system by using the phone keypads or voice commands. Other controls for interacting with the holding system, such as control buttons, voice commands or text keypads, may be provided on the accessory unit or the electronic device itself which may be especially adapted for interacting with such holding system. The accessory unit or electronic device itself may also be sold preprogrammed with embedded clips for demonstration use.

Additionally, such electronic devices may be capable of receiving or sending clips directly from one device to another device. To prevent transferring of entire files from one device to another, a security feature may be included on the devices and work in conjunction with the file.

One method of preventing the transferring of files is to encode each electronic device or accessory unit with unique scrambling/unscrambling wave capabilities. As such, when a user transfers an entire file to his device, say a cellular phone, for which he pays a fee, a scrambling wave, which may be a function of his unique telephone number, may be encrypted in the file. Upon playing the file, the user's cellular phone sends the corresponding unscrambling opposite wave. Other devices purchased by the same user may also include the unique scrambling/unscrambling wave encryption capabilities associated with the user's telephone number. As such, the files may only be played with clarity on the device or devices owned by the user, even if such files are transferred to other devices.

The security feature allows the original music or its representative to control distribution of music, and also provides an opportunity for music distributors to keep track of who plays their music. As such, a method of accounting for royalty payments to artists and performers and other parties registered with performing rights organizations such as ASCAP and BMI may include providing a tracking feature on electronic devices used by businesses such as bars, restaurants, and clubs to play music. In addition to allowing a record to be kept as to which music files have been downloaded and stored on the electronic device, the tracking feature may also record information on how many times and when each song has been played. This allows performing rights or music writers organizations the ability to keep an accurate record on which to base royalty payment distributions.

An electronic device having stored sound or image clips may include various features which allow the user to preprogram the clips to play in a set sequence or a random order. (For example, certain clips which may be from the same or differ-

ent songs may play in a congruous or back-to-back order with a fixed silence time between the clips.) Additionally, the device may have features allowing the user to classify and arrange the clips based on categories such as the type of clip (i.e., movie, song, etc.), artist name, time period, etc.

Thus, a user of an electronic device utilizing the clips according to the present invention will be able to arrange the clips either through a website from which the clips can be downloaded onto the device, or through the device itself.

Additionally, after listening to or viewing a clip, the user can choose to download the entire file from where the clip originated (i.e. the entire movie, song, etc.). The server providing the clips and the files may provide the clips for free or for a small fee as inducement for the consumer to ultimately download the entire file for which a greater fee may be charged.

An electronic device according to the present invention may also have the ability to receive clips which are directly transmitted onto the electronic device via audio or visual broadcasts. The user of an electronic device may program the device to sound a specified broadcast as an alert sound. For example, a sound segment from a live radio show (i.e., a sports show or a commercial) may be used to ring a cellular phone by either the caller or the callee.

Advertisements may also be transmitted through the electronic devices according to the present invention. A message such as "pick up the phone and don't forget to drink Coca Cola™" may be used to alert of an incoming call. Such transmitted advertising messages need not necessarily function as alerts.

Additionally, this invention contemplates the use of image and sound clips which can be combined such that the user can create a unique clip of both sound and image for use in electronic devices having display screens. For example, a phone having an appropriate display screen can be preprogrammed to display a visual clip of a caller accompanied by sound, or a computer alert may display an image clip with sound. An image clip may comprise a single image frame or a picture clip as well as an animation.

Website to be used as a Support Tool for Downloading Clips to Electronic Devices and Method for Selling

According to a preferred embodiment, a website for downloading sound and/or image clips holds a library of clips, each clip having a specific identifying code or icon which may include, for example, the title of a musical composition or movie from where the clip originated, the name of the artist, a code number, or other type of identification depending on the type of clip. For example, a song clip may be listed as barrywhite@lovestuff.wav, or may display the picture of the song artist or CD cover of the CD on which the song appears, along with the name of the song. The list may be organized according to the artist's name, by music classification (i.e., pop, jazz, R&B, hip hop, etc.), by length of the sound clip, by the type of sound clip (i.e., song, piano music, guitar music, loud, quiet, etc.), or any combination of these categories or other conventional categories depending on the type of clip (image or sound). The website may also include categories of longer clips which may be more suitable for phone rings, and shorter clips which may be more suitable for computer alerts. The website may further contain a suggested list of weekly or daily favorite clip picks, which may be provided for each category or subcategory. Additionally, items or subcategories in a given category may be organized alphabetically, by year of copyright, or any other conventional order.

Tables 1 and 2 are examples of possible arrangements for sound clips using music classification and artist name. Note that the listings of Table 1 such as barrywhite@lovestuff.wav are not websites, but use symbols associated with web use, such symbols being one of the many arbitrary ways of listing the clips. The symbol-driven website-like listings may end with other non-domain suffixes such as ".pop", ".song", etc. Additionally, this invention contemplates the use of website hyperlinks associated with each listing as shown below in Tables 1 and 2.

TABLE 1

R&B	Jazz	Rock
Barry White	Herb Alpert	Chicago
Barrywhite@lovestuff	herbalpert@sunspots.pop	Chicago@feelings.wav
Barrywhite@deepvox	herbalpert@datingame.pop	Chicago@time.wav

TABLE 2

R&B	Jazz	Rock
Barry White	Herb Alpert	Chicago
BW-01 A-Sexy	HA-01 A-Date	C-01 A-Begin
BW-02 A-Love	HA-02 A-Bull	C-02 A-Search
BW-03 A-Peace	HA-03 A-101	C-03 A-Color

The clips may also have an identifying number associated with each clip. Such identifying numbers may be used in downloading the clips to an electronic device using a telephone (described below) or other device having a number keypad. The website may further include a virtual personal locker or storage area for storing a selection of clips personal to a user which can be accessed on the website by a unique user identification name or code. As such, a user can store clips for later purchasing, downloading to the user's cellular phone, playing, etc. The website may also allow the user to upload personal clips such as family photos, voice recordings, home movies, and the like, to the storage locker for later downloading to the user's cellular phone or other electronic equipment. The storage locker may include an organizer for storing the clips in alphabetical order, by various categories, or any other order.

The website may allow for direct downloads of the clips from the website to the computer itself or to other electronic devices.

To illustrate how downloading through the website may be carried out, a user operating the computer may drag his/her mouse over the various listed sound or image clips and click on one or more selected clips. Thereafter, a box can appear prompting the user to select the appropriate electronic device onto which the clip or clips are to be downloaded (e.g., the box may say "CELLULAR PHONE DOWNLOAD OR COMPUTER ALERT DOWNLOAD?" Assuming that the "CELLULAR PHONE DOWNLOAD" button is selected, a prompt for typing in the appropriate cellular phone number will follow. Thereafter, the selected clip or clips may be uploaded to the user's personal locker and made available for downloading to the user's handset.

Other features may also be included, such as an option allowing the user to arrange multiple downloads in a specific order, create a folder for grouping multiple downloads, or a feature incorporated into the phone which causes it to ring a selected clip immediately after it has been downloaded. Additionally, clips, which have been previously downloaded to the phone may be deleted, rearranged, or reclassified with or without using the website. (There are other methods for storing clips on an electronic device such as a cellular phone,

some of which are described below, including direct downloading access for phones without the need for web phone access capabilities).

Alternatively, by clicking "COMPUTER ALERT DOWNLOAD," the selected clip will be downloaded to the user's computer, allowing the user to select many different sound and image clips for computer alerts, such as e-mail notification, computer alarm clock, and computer calendar notification.

Additionally, multiple clips may be associated with one type of alert, such that a different clip is played for each alert event. The user will be able to rotate alert clips and preprogram or randomize their order similar to a CD stereo carousel.

The user will also be able to hear or view a selected clip which will play on the website upon the user's command. Browsing capabilities wherein the user can drag his mouse over the sound clips library of selections and hear the clips without having to click or open a file may be included in the website. According to a preferred embodiment, a user simply drags his mouse over various clip samples, which light up or flash and play one at a time. Any time the user places the cursor over a category of music, the first tune in that category plays, and the icon representing that category of music switches to display the name of the artist and title of the song or composition being played. Once the user clicks upon that icon, he can select the next song and hear the song while at the same time seeing the name of the artist and song title. The user can cycle through all the songs within that category using this approach very quickly to not only browse but to also hear the music. If the user does not wish to switch over to another category of music, he simply moves the cursor to another icon and repeats this procedure. To select a particular song the user double clicks on the song, which is then included in a collection of selected songs to be downloaded later.

The website may be used as a shopping forum where consumers can hear or view the clips and click to buy items associated with the clips such as music records, cassette tapes and CD's, DVD's, and movie videos, or download the entire sound or image file to their computer for a fee. By allowing the user to sample and download clips for use as alerts in electronic devices, the website will provide an attractive forum for selling items associated with the sound and image clips, and for allowing the user to download the entire file associated with the clip, for which a fee may be charged.

Additionally, an identifying mini icon such as the song title or recording artist CD icon associated with a clip or with a group of clips may appear on the computer screen at a fixed location and/or at the screen display where the clip plays a computer alert. The icon may include a "buy" button which will allow the user to purchase an item associated with the clip, or download the entire file from which the clip originated by clicking on the button. Such "buy" button may be a hyperlink to a website for transacting the purchase. Where a CD icon is not used, the user may click on the song title to purchase an item associated with the clip. If the clip comes form a song that exists on more than one CD, the customer will see more than one CD cover to choose which CD to buy.

The utility of clips as alerts for electronic equipment will provide consumers with incentive to browse the website and sample the clips. After hearing or viewing the clip, consumers may be induced to purchase items associated with the clips, which they will be able to do instantaneously through the website by the click of their mouse.

The website may further be used as a contest forum. The website may be set up to play mystery clips or short segments of sound recordings which contestants will have to identify in order to win a prize (i.e., by being the first to e-mail or call with the correct answer). Thus, a radio show may set up a game where a short segment of a sound clip is played on the radio or user's phone for contestants to guess and is also available for the listeners who want to hear it again on the website.

The website may include forwarding capabilities, such that a sound or image clip can be forwarded as a greeting to a friend. (The security feature may be used only to prevent transferring of entire files). Consequently, the website will attract customers for the purpose of downloading clips to electronic devices and ultimately purchasing items associated with the clips. Additionally, the user may subscribe to a service such as an existing cell phone service provider for downloading files through their telephone, without having to be online.

The user may also create a clip (e.g. by recording a song or personal clip) and store the clip onto a sound storage element in the electronic device. Additionally, the electronic device can be preprogrammed with clips selected by the manufacturer retailer of the device.

Accessing of Sound and/or Image Files Without Access to Internet

Sound and/or image files which include clips may be downloaded without use of the Internet by allowing a user to access a library of clips via their cellular phone or home telephone or providing other electronic devices with features which allow automatic access to the library. (Although Internet free accessing will be described with respect to a telephone, it is to be understood that the method describe may be compatible with any electronic device preferably having accessing capabilities similar to a telephone).

The library may be a non-web holding unit that has files with associated codes which match the codes associated with the files on the website, wherein the website serves as a usable guide for identifying various files according to associated codes, such as numerical codes to assist the user in downloading files using voice commands or keypad commands.

Additionally, cellular phone or home telephone users may access a non-web holding unit with a library of stored files which can similarly be browsed, selected, and downloaded onto the phone using user voice commands, key pad commands, or by connection to a live operator. Such unit may be accessed by dialing a phone number (e.g., an 800 number). Home telephones and cellular phones may have separate holding units, such as a satellite for cellular phones and a ground unit for home phones, or a satellite can be used by cellular phones to access a ground holding unit.

To facilitate selection of the files from such holding unit, the access system may provide for a code associated with each file which may be obtained by browsing the website as described above. As such, a user connected to the holding unit would access the code associated with the file to select and download the file to the user's telephone.

Many other methods allowing a user to select files from the holding unit are possible. For example, the telephone may include a voice recognition feature, wherein the user can say the name or part of the name of the song he wishes to select (e.g., "Strawberry Fields" or the name of the song artist). The phone may also utilize hierarchical submenus whereby the user may press dial keys with letters corresponding to a selection in a given category which ultimately leads to the selection of a particular song. A phone having a screen display for providing a text listing of the names of songs or categories, according to hierarchical submenus, may also be used for enabling the user to narrow down to a list of songs and/or artists from which he can make his final selection.

A telephone may likewise be used to deliver files stored on the phone to a website, an e-mail address, another telephone, or other electronic device. Sound clips, which are segments of whole songs, musical compositions or other sound recordings, will be used mostly with telephones, however, downloading entire music or image files may also be done, subject to the security feature described above. Additional revenues may be generated as the consumer accesses the content library and uses airtime while browsing and downloading clips or entire songs from the library holding unit.

Furthermore, cellular phone and home telephone service providers may offer extra features to phone subscribers which would allow the subscribers to download and store sound files for use with the telephone in accordance with the present invention. Such features by service providers may include a personal sound file storage box (which may be a file of clips and/or entire sound files) that the user can access via a personal code. The user may be charged a monthly fee for a subscription to the service, and/or per downloading of each song, whether or not the user is a subscriber. Additional revenue can be generated by the service provider even if the service is provided without a special charge since consumers will use more airtime.

Telephone Using Sound Clips

A telephone having stored sound clips which may comprise real music including human voice, various instrument sounds, and other sound effects may allow the user to select one sound clip or a rotation of several clips to "ring" the phone. Although it is preferable to ring the telephone with sound clips, an entire music file may also be used, whereby for example, a song may start playing and continue until the user picks up the telephone. (Of course, entire music files may be played on the telephone solely for the user's listening pleasure). The telephone may also be programmed to ring a conventional chime if the user so chooses. Such a telephone may utilize a storage chip carrying stored sound clips as well as the conventional phone chime programmed onto it.

Additionally, the telephone may allow the user to determine how many times a clip is repeatedly played for each ring, and the time delay between clips in a given ring. The user may also choose to mix different clips in one ring. A telephone may also include a looping feature which rings the telephone in a looped clip such that the clip plays repeatedly without a pause between repetitions of the clip, or a "cluster" feature which rings a "cluster clip" comprising a multiple number of clip segments from a single song, musical composition, or other sound recording played in sequence.

Other features will allow the telephone user to preprogram the telephone to play a certain clip when a specific individual calls, thereby allowing the user to identify the caller based on the chosen sound clip. Each person who regularly calls the user may have a unique identifying ring. This will allow a telephone user to have the option of assigning a unique sound caller ID to each of an unlimited number of callers. Other features may include allowing a caller to select his own personal sound clip to "ring" the telephone of the recipient of the call. (For example, the caller may sing or record a "Happy Birthday" song.) Also, a telephone used by more than one user may utilize sound clips for a callee ID function wherein the caller identifies the intended callee (e.g., by dialing a digit or sequence of digits) and the telephone plays the clip associated with the callee.

Additionally, a telephone may be provided with a "caller message recorder feature" which allows the caller to record his/her own message to send to the number dialed. For example, the caller may send a message such as "Hey John. It's Mary. Pick up the phone," by pressing a "record ring" button on his/her phone to send such a message to John's phone. As described earlier, the telephone user, say John, may have a caller ID feature such that when a certain caller, say Mary calls, the telephone rings with a predetermined message or sound clip selected by John. The additional caller message recorder feature may cause John's telephone to play Mary's message instead of overlaying the predetermined caller ID message or clip. Additionally, John may record his own message such as "It's Mary" and associate that recorded message with Mary's phone number for a caller ID ring.

A telephone, according to the present invention, may also include a "sensory feature" for enabling the telephone to sense the level of ambient noise and adjust the loudness of the "ring" accordingly. If the phone "senses" very loud background noise, for example, a cellular phone located in a loud restaurant, the ring volume will increase. A feature for detecting whether a cellular phone is located in a pocket book or a place where the "ring" sound may be muffled is also contemplated. This feature will also enable the phone to adjust the volume of the"ring" such that the"ring" will be loud enough for the user to hear. Such detection mechanism can be achieved by detecting ambient light and other conditions.

Additionally, the user may manually adjust the volume of the ring via a tunable volume control mechanism or a multiple fixed settings control. (Although the above features are described with respect to a phone, it is to be understood that these features may also be provided with other electronic devices utilizing sound and/or image clips as alerts where applicable).

Transmission System for Delivery Clips to a Telephone

FIG. **1** is a schematic diagram illustrating the basic components for a wireless transmission system **100** for a telephone **102**, having a wireless or landline service provider.

The system is described in terms of two main components: a storage chip **104**, and a server **106**. The storage chip **104** is an element associated with the telephone which may be embedded into the phone or into an accessory unit which attaches to the phone, having abilities to interface with the phone. The existing hardware of a cellular phone may also be integrated with a software system which may be downloaded to the RAM element of the cell phone for incorporating the present invention, without the need for extra hardware. As such, the existing hardware of the cellular phone may be made to perform the same function of the chip.

The purpose of the chip **104** is to store a selection of clips, allow for downloading of clips to be stored on the chip **104**, and allow for the playback of clips, either by the telephone or the chip **104**. (Although the description herein refers to sound clips, it is to be noted that entire sound files may be stored, downloaded, and played, according to the system described). Additionally, the chip **104** can associate the stored clips with a caller ID so that the particular clip to be played back is determined by the calling subscriber ID.

The server **106**, which is associated with a collection of stored clip files **108**, is designed to execute requests of the chip **104**, which may be given through user voice commands or commands using the phone keys. The server may be equipped with a voice adapter **110** for supporting the ITU-T V.253 standard and telephone lines attached to the voice adapter. The voice adapter can also support some standard modem protocols, like V.32 or V.34, if required for compatibility.

The server **106** also allows for files to be transmitted to the chip **104** for storage. The system **100** enables a connection to the server **106** upon a request from the chip **104**, utilizing the

phone, and/or PSTN (Public Switched Telephone Network), and/or a voice card (voice modem) attached to the server computer.

The system may have a voice menu, which, after connection to the server **106**, allows the user to listen to the server's menu and navigate through the system of voice menus using the telephone's Dual Tone Multi Frequence (DTMF) keys. The system may allow the user to select and download clips by allowing the user to listen to the clips presented by the server **106**, select a clip, and issue a download command to the server **106**. The server then sends the selected clip (e.g. in digital compressed form) using a Custom Data Transmission Protocol (CDTP) over the voice channel. (Illustrated in FIGS. **2** and **12**).

The system **100** allows for storage of a large number of clip files in the chip's memory. The system's server **106** utilizes a music compression algorithm, shown in FIG. **15**, which converts common music files into compressed files that are downloaded and stored by the chip **106**. For example, a chip supporting the storage of about 1000 clips, each being approximately a few minutes in length, may have a flash memory size of about 40 Mbytes. The chip **104** may also have a sound output element such as speakers.

The server comprises software which can run under Windows 98, Windows-NT OS, or other suitable system using a voice modem for communications. Additionally, the system may use a single modem or a pool of several modems.

Preferable Embodiments for a Telephone System

Examples of telephone systems utilizing the method of the present invention include a cellular phone which may utilize an analogue (voice-only) system or a digital system, and a conventional land line telephony network. A system for using a cellular network infrastructure is shown in FIG. **2**. A schematic diagram of a landline transmission system for a home telephone is shown in FIG. **12**. (Again, although the following descriptions make reference to the use of sound clips, it is to be understood that entire sound files may also be used as described).

All described examples assume existence of a server preferably dedicated for servicing user requests and providing sound clip data download capabilities. A corresponding chip, implementing all required functions is associated with the telephone.

The server may be a computer running Microsoft Windows or other suitable environment, such as a Pentium-III PC, Win95/98/NT/2000, 128 Mb RAM, 4 GB HDD. The server may store or be capable of accessing a sound clip database, which may be stored on a website or non-web holding unit. The sound clip database is stored in a compressed file format of those commonly known.

A schematic diagram for a server software system is shown in FIG. **4** for a cellular phone system, and FIG. **14** for a landline system. The software may be written in C++ under Microsoft Windows or other suitable language. The functions of the server software include servicing user requests via a user interface element and transmitting a selected sound clip through the phone line via a music clip transmission element.

According to a preferred embodiment, the functions of the user interface element include decoding DTMF keys pressed by the user and playing the voice menu labels to the user. The voice menu interface may include hierarchical submenus, leading to different functions. In all examples, the user interface element can be unified in the sense that the voice interface and DTMF or voice recognition-based interface are independent of the type of network or type of phone(s) used. Implementations that utilize a single server to process requests originating from different types of networks and/or phones can therefore be built.

The system of submenus leads a user to the downloading of the selected sound clip. Thereafter, control is transferred to the music clip transmission element for downloading sound clips into the phone. The music clip transmission element interfaces directly with the phone accessory unit, independent of the user. The music clip transmission element is dependent on the type of the phone used and the network infrastructure.

Example Transmission System for a Cellular Phone and Network

FIG. **2** is a schematic diagram of a wireless transmission system **200** for a cellular phone **202**, which may be either an analogue (voice-only) or digital system. In both cases, a specialized board **203**, implementing all required functions, similar to the chip **104**, is incorporated in an accessory unit **204** attached to the cellular phone. Although the system **200** is described as incorporating an accessory unit, it should be understood that a chip performing the same functions of the board may instead be embedded in the phone itself, or a software system may be integrated with the existing hardware chip of a conventional cellular phone without the need for additional hardware. The system **200** further includes a server **206** and software **207** for the server.

The cellular telephone **202** may be any commercially available cellular phone having capabilities for supporting a command set for general telephone control, [i.e., a V.25 Ter serial asynchronous automatic dialing and control as recommended by the ITU-T (International Telecommunication Union—Telecommunication sector)] and for supporting V.25 Ter "+C" extensions according to the ETSI (European Telecommunications Standards Institute) ETS-300-916 standard for obtaining codes of keys pressed by the user and for receiving caller ID information. Additionally, the phone **202** should have capabilities for subscribing to a cellular provider **208** with caller ID service support.

A schematic diagram of the board **203** is shown in FIG. **3**. In an embodiment where an accessory unit is used the board **203** is implemented in the accessory unit **204** which can be attached to the phone **202** through a standard extension connector where other commercially available accessories such as a hands free ear set and charging adapter are typically connected.

The board **203** includes the following main blocks: a Digital Signal Processor (DSP) **300**, a flash memory element **302**, a Random Access Memory (RAM) element **304**, an initial bootstrap chip **306**, an analogue interface element **308**, and a digital interface element **310**.

The processor **300** executes the device firmware, provides control for all other blocks and performs the computational tasks for the board **203**. The tasks performed by the processor **300** include control of the board's units, monitoring of keys pressed by the user and processing of key-press events, reception of information from the computer through the computer digital interface, reception of caller ID information through the phone digital interface, reception of packed sound clips through the phone analogue or digital interface, unpacking and then playing back sound clips through a built-in speaker connected to the analogue interface of the accessory unit **204**, support of a voice menu-driven user interface, and performance of other auxiliary functions.

The flash memory element **302** contains the device firmware, and sound clips which can be pre-loaded as well as downloaded from the server. The RAM element **304** enables the processor to run faster and also holds buffers for unpacked

sound fragments and processor service procedures. When the power is turned on, the initial bootstrap chip **306** loads the device.

The analogue interface element **308** includes a phone interface element **312** and a built-in speaker interface element **314**. The phone interface element **312** is used for input and output of signals when downloading sound clips from the server **206**. The speaker interface element **314**, with the speaker, plays all system sounds heard by the user including voice menus and sound clips.

The digital interface element **310** includes a phone interface element **316** and may include a computer interface element **318**. The phone interface element **316** is used for phone control and for receiving key codes and caller ID information from the phone. The computer interface element **318** is used for various service functions such as downloading preprogrammed sound clips from the computer to the flash memory.

The functions of the server software, shown in FIG. **4**, include servicing a user's requests via a user interface element **402** and transmitting a selected sound clip through the phone line **404** via a music clip transmission element **406**.

A user interface element **402** is provided whose functions include decoding DTMF keys pressed by the user and playing the voice menu labels to the user. The voice menu interface may include hierarchical submenus which lead to the downloading of the selected sound clip. Thereafter, control is transferred to the music clip transmission element **406** for downloading sound clips into the phone. The music clip transmission element **406** interfaces directly with the phone accessory unit, independent of the user.

The selected sound clip may be transmitted through the phone line to the accessory unit **204** first through the server hard drive **408**, then through the server software **207**, next through the voice adapter **210**, then through the phone line of the network to the cellular service provider **208**, to the cellular phone **202**, and through the analogue interface **308** of the accessory unit **204**, then through the processor **300** of the accessory unit **204**, and finally, through the flash memory element **302** of the accessory unit **204**. When the sound clip transmission is completed, the task of the music clip transmission element is completed. Thereafter, the phone line **404** is released and control is transferred to the user interface element **402**.

In an autonomous mode, the board **203** may contain a number of pre-loaded sound clips. Initially, the board **203** is in the inactive state. The board **203** and phone **202** interact such that the phone sends to the board codes of all the keys pressed by the user. Upon receiving a particular sequence of codes or when, for instance, a particular key is pressed for a prolonged period of time, the board **203** switches to the active mode. In the active mode the board **203** may interact with the user via a voice menu-driven interface where voice messages, via a speaker, prompt the user to respond by pressing a selection of phone keys indicating the user's responsive selections. The board **203** reacts to the user's selections by analyzing the keys being pressed.

The clips are stored on an internal clip index which can be retrieved from the internal memory and played back according to key commands provided by the user. Examples of voice menu options provided by the device **204** through a speaker upon switching to an active mode include: 1) the user may choose to exit the active mode and enter the passive mode (e.g., by pressing "0"); 2) the user may choose to listen to the current sound clip on the clip index (e.g., by pressing "1"); **3**) the user may choose to listen to the next clip on the index (e.g., by pressing "2"); 4) the user may choose to listen to a previous clip on the index (e.g., by pressing "3"); or 5) the user may choose to assign a caller ID number to the current clip on the index (e.g., by pressing "**4**").

Upon choosing to assign a caller ID phone number to the current clip, the device may switch to a sub mode with a sub-menu having the following options: 1) the user may choose to switch back to the previous menu (e.g., by pressing "0"); 2) if the selected clip was already assigned, the user may choose to get information regarding the caller ID already associated with the clip (e.g., by pressing "1"); or **3**) the user may input a new caller ID phone number for the current clip (e.g., by pressing "2" indicating this choice, then dialing in the phone number followed by the "#" sign).

In the passive mode, the device **204** may analyze messages being received from the telephone **202**. Upon receiving an incoming call, the device **204** checks the incoming caller's phone number against the list of assigned caller ID sound clips in its memory and plays back the particular sound clip through the built-in speaker if the specified caller's phone number was assigned to this clip. Alternatively, the device **204** may play back a default sound if the particular caller ID was not assigned to any clip.

In order to transfer digitally compressed sound clip data through the analogue channel a special method and algorithm to map digits to sounds is used. This method is implemented not only for a cellular telephone using an analogue cellular network but also for a landline transmission system of a home phone, shown in FIG. **12**.

Method for Data Transmission Over an Audio Channel of a Wireless Telephone

A data transmission method **500** for transferring data through the phone line and the receiver, based on a voice mode connection (versus data mode) and DTMF signal interpretation is illustrated in FIG. **5**. A similar approach can be implemented for a landline telephone that does not have a data transmission mode.

For transmitting data through the phone line, the transmission method **500** comprises the steps of a) data scrambling **502**, b) data mapping **504**, c) conversion of frequency symbols to time samples **506**, d) addition of cyclic prefix **508**, and e) digital to analogue conversion **510**. The data is then sent through the receiver, following the reverse steps of f) analogue to digital conversion **512**, g) symbol synchronization **514**, h) conversion of time samples to frequency symbols **516**, i) decoding frequency symbols to bits **518**, and j) descrambling the data **520**.

The transmission method is used to provide enough speed for the data transmission. The transmission method allows simultaneous use of the voice communication and data transmission features (during one connection session) without having to switch the mode of connection. A customer does not need to use a Wireless Internet Service Provider. A user can simply place a regular call to the specific number (e.g., an "800" number) to gain access to the Server. The dual-mode connection allows for voice and "push button" support as well as voice recognition service.

An orthogonal frequency-division multiplex (OFDM) modulation scheme is used for data transmission. The benefits of OFDM include: 1) the modulation can be made robust to Inter-Symbol Interference (ISI) by increasing symbol size; 2) the modulation can be made robust to impulse noise by increasing symbol size; 3) for each individual sub-channel, the channel's response could be considered essentially flat, minimizing the need for channel equalization; and 4) differ-

ent encoding schemes could be used for different sub-channels, for accommodating frequency-selective channel distortions.

The total bandwidth to be used by the method is determined by the worst case of supported audio channel. A suitable algorithm for compression of the voice channel is the GSM RPE-LTP algorithm which essentially has a built-in down-sampling by a factor of 3 in which the allowed bandwidth is limited at 4000/3=1333 Hz. Usually channel response is severely limited at frequencies below about 200 Hz to 250 Hz. No OFDM symbol time-windowing is employed to minimize variations of transmitted signal amplitude envelope.

A compressed voice channel can also introduce significant non-linear distortions. Therefore, it is not feasible to have a large number of sub-channels; otherwise the algorithm would be affected by significant inter-channel interference (ICI) due to loss of orthogonality between sub-channels. About 32 sub-channels appear to provide enough symbol size while maintaining satisfactory low ICI.

Modulation Symbol Structure

Each OFDM symbol consists of a minimum number of samples sufficient to represent all sub-channels. To increase computation efficiency, a Fast Fourier Transform is employed to convert sub-channel symbols from frequency to time area. Therefore, for 32 sub-channels, OFDM symbol size should be at least 64 real samples (at 2666 Hz rate). A circular prefix of 16 samples is used to improve separation between symbols, and minimize ISI (Inter Symbol Interference) and ICI. Therefore, total symbol size is 80 samples at 2666 Hz.

Receiver Synchronization

Circular extension prefix redundancy, present in the signal, is used to facilitate OFDM symbol synchronization in the receiver. A synchronization subsystem effectively computes auto-correlation coefficients of the received sequence (e.g., at 2666 Hz). The output of the correlator goes through a "rectifying" phase-locked loop-like system which outputs synchronization impulses at the proper time instants to sample OFDM symbols correctly.

Synchronization system induced timing jitter leads to rotation of received sub-channel phasors by increments, proportional to the central frequency of a particular sub-channel. This rotation is compensated in the decision scheme.

Data Mapping

The output of a scrambler is mapped onto complex symbols (amplitude/phase) of the OFDM sub-channels. Individual sub-channels use QPSK (Quadrature Phase Shift Keying) modulation.

Data Scrambling

Data scrambling is employed in order to provide statistically random distribution of transmitted symbols to reduce peak-to-average power ratio of OFDM symbols. A self-synchronizing scrambler with generating polynomial of $1+x^{-18}+x^{-23}$ is used which, at the transmitter, effectively divides the data sequence by the generating polynomial. The coefficients of the quotients, taken in descending order, form the output data sequence.

Example Using Analogue Cellular Network and Cellular Telephone

The above-described accessory unit **204** is provided in this example in the context of analogue (providing only voice channel) cellular network.

Initially, the device **204** is in an inactive mode. A user dials the server number and, navigating through a system of voice menus supported by the server software, listens to and selects a particular sound clip in the same way as browsing the loaded sound clips in the autonomous mode. Instead of assigning a caller ID, the user may choose to download sound clips.

When a user, navigating through the server voice menus, selects to download the current clip and in the embodiment using an accessory unit activates the accessory unit **204** through the predefined key sequence, the process of transmission of the selected sound clip is initiated. After selecting a "download" option, the user may press a specific key combination on the phone to switch the accessory unit **204** from the inactive to the active mode. The unit **204** then begins to interact with the server **206**, using the analogue channel provided by the phone and network. The already established phone connection is used to receive information. The device may receive the sound clip selected by the user and download it into internal flash memory.

At the end of a session, the unit **204** forces the telephone **202** to hang up and switches to the autonomous mode which enables the user to assign a new caller ID to the sound clip just received. When a user, navigating through the server voice menus, selects to download a clip and activates the accessory unit **204** through the pre-defined key sequence, the process for transmission of the selected sound clip is initiated.

The selected sound clip is transmitted through the phone line to the accessory unit **204** first through the server hard drive **408**, then through the server software **207**, next through the voice adapter **210**, then through the phone line of the network to the cellular service provider **208**, to the cellular phone **202**, and through the analogue interface **308** of the accessory unit **204**, then through the processor **300** of the accessory unit **204**, and finally, through the flash memory element **302** of the accessory unit **204**.

Generally, the server software **207** retrieves the selected sound clip from a database **212**, converts it to the special sequence of sounds modulates, transfers codes of these sounds to the voice adapter **210** that converts these codes to actual sounds and transfers these sounds to the phone line **214**. From the phone line **214**, the sounds go to a cellular provider **208** through to a radio channel, and to the cellular phone **202** itself (much like voice sounds are transferred during a normal phone conversation). The sounds then go through the connector and are received in analogue form by the board **203**. The sounds are then converted by the device ADC (Analog to Digital Converter) to the digital form and are processed by the DSP (digital signal processor—"demodulated") **300** to the same digital data form initially stored on the database **212** (e.g., in MPEG audio format). In this form, the sound clip data are written into the flash memory **302** of the device **204**.

Following a reverse direction, going from the board **203** to the server **206** using the same chain, the device sends to the server either an "acknowledgement" of a successful delivery of the sound clip data or a list of data blocks received with errors so that these blocks can be resent in a second try. In order to transmit digital data through the analogue channel, a similar procedure is used to convert data to sounds and back.

When all the data is transferred without errors, the board **203** signals to the server **206** that the call may be disconnected. Thereafter, the server **206** instructs the voice adapter **210** to hang up, freeing the phone line for another client, and the board **203** switches to the autonomous mode, allowing the user to assign a caller ID to the sound clip most recently downloaded.

Example Using Digital Cellular Network and Cellular Telephone

The above-described accessory unit **204** is used in this example in the context of digital (capable of providing a dedicated data transmission channel) cellular network. Since in this case a digital channel is used for sound clip data transmission, no modulation is required on the mobile phone side. The server, on the other hand, uses a modulation protocol compatible with the protocol supported by the cellular network provider. Usually this can be accomplished by using a standard ITU-T-approved modem, like V.32 or V.34.

Initially, the unit **204** is in an inactive mode. A user dials the server number and, navigating through a system of voice menus supported by the server software, listens to and selects a particular sound clip in the same way as browsing the loaded sound clips in the autonomous mode. Instead of assigning a caller ID, the user may choose to download sound clips.

When a user, navigating through the server voice menus, selects to download the current clip and activates the accessory unit **204** through the pre-defined key sequence, the process of transmission of the selected sound clip is initiated. After selecting a "download" option, the user may press a specific key combination on the phone to switch the accessory unit **204** from the inactive to the active mode. The unit **204** then begins to interact with the server **206**, using the digital channel provided by the phone and the network. If possible, the already established phone connection is used, or a new connection is established specifically for digital data transmission.

The selected sound clip is transmitted through the phone line to the accessory unit **204** first through the server hard drive **408**, then through the server software **207**, next through the voice adapter-modem **210**, then through the phone line of the network to the cellular service provider **208**, to the cellular phone **202**, and through the digital interface of the accessory unit **204**, then through the processor **300** of the accessory unit **204**, and finally, through the flash memory element **302** of the accessory unit **204**.

Generally, the server software **207** retrieves the selected sound clip from a database **212**, transfers codes of these sounds to the voice adapter-modem that converts these codes to actual sounds, using one of the standard modulation protocols supported by the cellular provider (like ITU-T V.32 or V.34) and transfers these sounds to the phone line **214**. From the phone line **214**, the sounds go to a cellular provider **208**, where they are demodulated back into digital data and then the data goes to the cellular phone **202**, through the radio channel, using the digital channel provided by the cellular network. The data is then received by the processor of the accessory unit, and then written into the flash memory **302** of the device **204**.

Following a reverse direction, going from the board **203** to the server **206** using the same chain, the device sends the server either an "acknowledgement" of a successful delivery of the sound clip data or a list of data blocks received with errors so that these blocks can be resent in a second try. When all the data is transferred without errors, the board **203** signals to the server **206** that the call may be disconnected. Thereafter, the server **206** instructs the voice adapter-modem to hang up, freeing the phone line for another client, and the board **203** switches to the autonomous mode, allowing the user to as sign a caller ID to the sound clip most recently downloaded.

In order to provide a guaranteed and error-free delivery of digitally compressed sound clip data through the data channel provided by the phone and network, a special error detection and correction method is proposed.

A Data Transmission Method with Error Correction Delivery

A method for data transmission with error correction assumes a sufficiently low probability of error in the channel and implements error correction by re-sending the affected data blocks. The data (i.e. the compressed sound clip) is split into smaller data blocks by the server. Each block is supplied with a special header that, in particular, includes the block number and a cyclic redundancy code word for error detection, computed for the block data and header. Other error detection codes can also be utilized. The data blocks are then sent through the data channel sequentially. Using the redundancy code, the receiver (i.e. the mobile device) checks the correctness of each received block. The size of blocks is selected in such a way that 1) there is a high probability of error-free transmission of a block; and 2) the overhead introduced by additional control information (e.g. header, CRC word) is not high compared to the data payload.

If the block size is selected properly, only a few blocks out of the entire sequence are usually affected by channel errors. These erroneous data blocks are re-sent by the Server upon receiving special requests.

Depending on the availability of bi-directional data transfer, one of two protocols can be used. If the phone and network support simultaneous transmission of data in both directions, a protocol that uses simultaneous transmission of data in a server-to-phone direction and acknowledgements in a phone-to-server direction can be utilized. In this case, a special acknowledgement packet is sent for each valid data block received by the device. If a block is received with an error, a negative acknowledgement packet is sent.

The sever software, receiving these control packets, either sends the next subsequent data block, until all data blocks are transferred, or resends the block received with error. When all data blocks are transferred, and the positive acknowledgement is received for the last block, the sound clip is considered to be completely delivered. An example of such interaction is shown in FIG. **16** for a protocol with individual packet acknowledgement for full-duplex channel, showing three data blocks **1600**, **1602**, and **1604** for corresponding data, indicated in the figure as "Data**1** '"Data**2**" and "Data**3**", with corresponding headers "Hdr**1**", "Hdr**2**", and "Hdr**3**". Positive acknowledgements "Ack**1**" and Ack**2** " are sent for packets numbers **1** and **2**. Packet number **3** is originally received with an error, indicated by "Nack" and is subsequently re-sent to successfully correct the error, whereby a positive acknowledgement "Ack**3**" is sent.

If the phone or network supports only unidirectional data transmission, the other protocol can be utilized to minimize the number of channel direction alterations. In this case, all data blocks for the sound clip are sent at once by the server, without receiving acknowledgements for the individual packets. Then, a single control packet is transferred in the opposite (device to server) direction. This control packet contains a bit mask, with one bit for each data block received. Each bit in the bit mask has a "1" value if the corresponding data block was received without errors, or a "**0**" value if the corresponding block was affected by errors. The server then re-sends those blocks that were received with errors in the first pass. When all data blocks are transferred, and the acknowledgement mask without errors indication is received by the server, the sound clip is considered to be completely delivered. Example of such interaction is shown in FIG. **17**, where the packet number **2** is originally received with an error and is successfully re-sent subsequently to correct the error. Note that only two "ACK" packets were sent during the entire procedure.

Example Using Landline Telephony Network and a Conventional Home Telephone

FIG. **12** illustrates an example of a landline telephony network system **1200** using a voice channel and a conventional home telephone **1201**, according to a preferred embodiment. (Although this system is described with respect to the accessing and delivery of sound clip files, it is to be understood that the system may be used for the accessing and delivery of entire files).

The system **1200** has two main components: a home telephone accessory unit **1202** and a server **1205**. The accessory unit **1202** is an autonomous unit, attached to the phone line **1208** and to the phone (between the line and the phone), and powered from the AC power outlet. A chip performing the same function of the accessory unit may instead be embedded in the phone itself The purpose of the accessory unit **1202** is to support selection, downloading, and playback of sound clips according to the Caller ID of the calling subscriber. The accessory unit **1202** may include a speaker system and enables the phone to ring sound clips or perform other functions as described for the cellular phone **102**.

The server **1205**, which is associated with stored clip files **1206**, which may be stored on a website or a non web holding unit, is designed to execute requests of the accessory unit **1202** either through user voice commands or commands using the phone keys, and allows for files to be transmitted to the accessory unit **1202** for storage. The system **1200** enables a connection to the server upon a request from the accessory unit **1202**, utilizing the phone and PSTN (Public Switched Telephone Network), and an adapter **1204** (voice modem) attached to the server computer. The system **1200** may have a voice menu, which, after connection to the server, allows the user to listen to the server's menu and navigate through the system of voice menus using the phone's DTMF keys. The system may allow the user to select and download clips by allowing the user to listen to the clips presented by the server, select a clip, and issue a download command to the server. The server then sends the selected clip (e.g., in digital compressed form) using the Custom Data Transmission Protocol (CDTP) over the voice channel.

The device **1204** may further interface with a home PC **1214** for downloading sound files to the device. The interface may be a plug in connection or may use a wireless network system.

The accessory unit **1204** may be sold as a unit compatible to most home phones including cordless phones, and may connect directly to the phone jack, with the phone connected to the device. Similar to the cellular phone **102**, a home phone may include an embedded chip, instead of the accessory unit **1204**, for performing functions similar to those of the accessory unit **1204**.

The handset of a cordless phone utilizing sound clips according to the present invention may ring simultaneously with the box, wherein the handset may sound a regular phone ring or a sound clip ring, while the box plays a sound clip ring.

The server comprises software shown in FIG. **14**, which can run under Windows 98®, Windows-NT OS®, or other suitable system using a voice modem for communications. Additionally, the system may use a single modem or a pool of several modems.

Initially, the accessory unit **1202** is in an inactive mode. A user dials the server number and, navigating through a system of voice menus supported by the server software, listens to and selects a particular sound clip in the same way as browsing the loaded sound clips in the autonomous mode. Instead of assigning a caller ID, the user may choose to download sound clips.

When a user, navigating through the server voice menus, selects to download the current clip and activates the accessory unit **1202** through the pre-defined key sequence, the process of transmission of the selected sound clip is initiated. After selecting a "download" option, the user may press a specific key combination on the phone to switch the accessory unit **1202** from the inactive to the active mode. The device **1202** then begins to interact with the server **1205**, using the analogue channel provided by the telephone and the network. The already established phone connection is used to receive information.

The selected sound clip is transmitted through the telephone line to the accessory unit **1202** first through server **1205**, next through the adapter **1204**, then through the telephone line of the PSTN to and through the analogue interface **1305** of the accessory unit (shown in FIG. **13**), then through the processor **1301** of the accessory unit **1202**, and finally, through the flash memory element **1302** of the accessory unit **1202**.

A schematic diagram of a board **1300** implemented in the accessory unit **1202** is shown in FIG. **13**. The board includes the following main blocks: a processor element **1301** [e.g., a Digital Signal Processor (DSP)], a flash memory element **1302**, a Random Access Memory (RAM) element **1303**, a bootstrap chip **1304**, an analogue interface element **1305**, and a digital interface element **1306**.

The processor **1301** executes the device firmware, provides control for all other blocks and performs the computational tasks for the board. The tasks performed by the processor **1301** include: control of the board's units, monitoring of keys pressed by the user and processing of key-press events, reception of information from the computer through the computer digital interface, reception of caller ID information from telephony service provider, reception of sound clips through the phone analogue interface, unpacking and then playing back sound clips through a built-in speaker connected to the analogue interface of the accessory unit **1202**, support of a voice menu-driven user interface, and performance of other auxiliary functions.

The flash memory element **1302** contains the device firmware, and the sound clips which can be pre-loaded as well as downloaded from the server. The RAM element **1303** enables the processor to run faster and also holds buffers for unpacked sound fragments and processor service procedures. When the power is turned on, the bootstrap chip **1304** loads the device.

The Analogue Interface element **1305** includes a telephone interface element and a built-in speaker interface element. The telephone interface element is used for input and output of signals when downloading sound clips from the server **1205**. The speaker interface element with the speakers, plays all system sounds heard by the user including voice menus and sound clips.

The digital interface element **1306** may include a computer interface element and other digital interface elements to the home network. The computer interface element may be used for various service functions such as downloading preprogrammed sound clips from the computer to the Flash Memory.

In an autonomous mode, the accessory unit **1202** contains a number of pre-loaded sound clips. Initially, the accessory unit is in the inactive state. The accessory unit **1202** and telephone **1201** interact such that the telephone **1201** sends to the accessory unit **1202** codes of all the keys pressed by the user. Upon receiving a particular sequence of codes or when, for instance, a particular key is pressed for a prolonged period of time, the accessory unit **1202** switches to the active mode. In the active mode, the accessory unit **1202** may interact with

the user via a voice menu-driven interface where voice messages, via a speaker, prompt the user to respond by pressing a selection of phone keys indicating the user's responsive selections. The accessory unit **1202** reacts to the user's selections by analyzing the keys being pressed.

In the passive mode, the accessory unit **1202** may analyze messages being received from the telephone **1201**. Upon receiving an incoming call, the accessory unit **1202** checks the incoming caller's phone number against the list of assigned caller ID sound clips in its memory and plays back the sound clip through the built-in speakers if the specified caller's phone number was assigned to this clip. Alternatively, the accessory unit **1202** may play back a default sound if the particular Caller ID was not assigned to any clip.

A schematic diagram of the server software is shown in FIG. **14**. The server software is used for servicing user requests through user interface element **1401**, and transmitting the selected sound clip through the phone line via music clip transmission element **1402**. The user interface element **1401** decodes DTMF keys pressed by the user, and plays voice menu labels to the user. The voice menu interface includes hierarchical submenus to lead the user to the downloading of the desired sound clip, where control is transferred to the music clip transmission element **1401**.

The music clip transmission element **1401** downloads sound clips to the phone, independent of the user interface element, interfacing directly with the phone accessory unit. The music clip transmission element **1402** initially transmits the selected sound clip to the adapter **1404** for data transmission from the server to the accessory unit. When the sound clip transmission is completed, the task of the music clip transmission element is done, and the telephone line is released and control is transferred to the user interface element **1401**

Generally, the server software retrieves the selected sound clip from a server database **1403**, which is associated with an audio data optimization and compression element **1405**, converts the clip to the special sequence of sounds modulates, and transfers codes of these sounds to the adapter **1404** which converts these codes to actual sounds and transfers these sounds to the phone line **1406**. From the phone line **1406**, the sounds go through the PSTN and are received in analogue form by the accessory unit **1202**. The sounds are then converted by the device ADC (Analog to Digital Converter) to the digital form and are processed by the DSP (digital signal processor) **1301** to the same digital data form initially stored in the server database **1403** (e.g., in MPEG audio format). In this form, the sound clip data are written into the flash memory **1302** of the accessory unit **1202**.

Following a reverse direction, going from the accessory unit **1202** to the server **1205** using the same chain, the device sends to the server either an "acknowledgement" of a successful delivery of the sound clip data or a list of data blocks received with errors so that these blocks can be resent in a second try. In order to transmit digital data through the analogue channel, a similar procedure is used to convert data to sounds and back. When all the data is transferred without errors, the accessory unit **1202** signals to the server **1205** that the call may be disconnected. Thereafter, the server **1205** instructs the adapter **1204** to hang up, freeing the phone line for another client, and the accessory unit **1202** switches to the autonomous mode, allowing the user to assign a Caller ID to the sound clip most recently downloaded.

The server audio data optimization and compression element **1205**, utilizes a music compression algorithm outlined in FIG. **15**, which converts common music files into compressed files in order to reduce the audio clip size for minimizing its download time, while maintaining predetermined audio quality. These files are downloaded and stored by the accessory unit **1202**.

Preferred Procedure for Audio Data Parametric Optimization and Compression

The method **1500** of compressing the files comprises the steps of a) conversion **1502**; b) amplitude normalization **1504**; c) sample rate conversion **1506**; d) pre-emphasis filtering **1508**; e) amplitude normalization **1510**; and f) performance of MPEG audio layer **3** (MP3) compression with the selected parameters **1512**. The compressed files are then transferred to the server database.

Step **1502** of conversion to mono only needs to be performed if the input file is in stereo and if the audio output subsystem of the target hardware is only capable of playing back mono audio. At this step all available information is included into the output audio by summing of the left and right channels to form a single mono output.

After conversion, or if the file does not need to be converted to mono, compression begins with the step **1504** of amplitude normalization, wherein sample amplitudes in the file are normalized. This step is required for enabling audio utilization of all available dynamic range and for improving the computational accuracy of subsequent steps. In order to maximize preservation of original audio range, a fixed coefficient for the entire audio file normalization is used. The coefficient is obtained using input file analysis to "stretch" the input audio range over the maximum available range.

Step **1506** converts sample rate of audio files to selected sampling frequency. The original audio clips may have various sampling rates (44100 Hz, 48000 Hz, 22050 Hz, 11025 Hz, etc.). After analysis of available hardware capabilities an optimal sampling frequency, which provides the most adequate audio quality, is selected. Increasing the sampling frequency above the optimal sampling frequency would not significantly increase the perceptual audio quality, due to the limitations of the audio output subsystem of the accessory unit. For example, for the cellular phone system of FIG. **2**, after analysis of available hardware capabilities and a series of perceptual tests, the 22050 Hz sampling frequency was selected as providing the most adequate audio quality since the audio output subsystem of the accessory unit has a relatively sharp drop in response for frequencies above 10–12 kHz.

In order to avoid aliasing effects when changing from higher to lower sampling rate, a low-pass pre-filtering with a cutoff slightly lower than the new Nyquist frequency is applied before down sampling. For rates that are not multiples of each other, cascaded sampling rate conversion schemes are constructed to minimize memory consumption and improve performance.

The step **1508** of pre-emphasis filtering, along with the re-sampling of the previous stage, takes into account the specifics of the audio output subsystem of the accessory unit, to achieve improvement of the perceptual audio quality, and to reduce the resulting audio size after compression.

Since the speaker of the audio output subsystem of accessory unit is preferably very small, the resulting sound has very low power in the low frequency range. Therefore, providing output in the low frequency range is likely to be futile, as it would only increase the size of audio file without any perceptual improvements. Additionally, providing output in the low frequency range may create undesirable "overflow" effects for the speaker.

For example, for the cellular phone system of FIG. **2**, all frequency content below about 400 Hz is removed from the

audio. In order to make the audio more "perceptually rich" in the low-frequency range, frequencies around 600 Hz are increased by about +6 dB. The frequency range from 1200 Hz to 8200 Hz is kept unchanged. Then, starting from about 8200 Hz the signal power is gradually increased, up to +15 dB at the highest frequency (11 kHz). This compensates for the drop in speaker transfer function at high frequencies and improves the listening experience.

A set of subjective audio perceptual tests with various types of audio contents, using the wide spectrum of hardware of the target platform has proved that the above-described pre-emphasis significantly improves the perceptual quality of resulting audio. At the same time, reducing frequency contents in the "non-significant" frequency regions allows reduction of the resulting compressed audio size, since the data bits are not allocated to non-used frequencies.

The described pre-emphasis procedure is implemented by a filtering with a FIR (Finite Impulse Response) filter, according to the formula:

$$y_k = \sum_{i=0}^{N-1} b_i \cdot x_{k-i}$$

where b_1 are filter coefficients,

x_k is the k-th output audio sample,

y_k is the k-th output audio sample.

The b_1 coefficients are fixed and computed for the particular sampling rate and the desired pre-emphasis response curve. The filter can be designed to have a linear phase response (this is actually guaranteed if the b_1 coefficients are symmetric), which would ensure absence of phase distortions to the audio. Since the delay introduced by the filter is not harmful for off-line processing, the filter size can be made rather large to approximate the desired response curve with a high precision.

After completing the step of pre-emphasis filtering, normalization of the sample amplitude is once again performed. Since the filtering significantly changes the signal, the second amplitude normalization step **1510** is required to convert resulting audio "loudness" to some pre-defined value.

Proceeding to step **1512**, the processed audio clip is compressed into an MPEG Layer 3 bit stream. The resulting bit rate (level of compression) can be varied to suit different needs. For instance, it can be made dependent on the source audio clip length, to make the compressed file fit into a predefined size. Alternatively, it can be made dependent on the anticipated delivery method (to create, for instance, a "built-in" audio clip of a very good quality, or to make the audio clip of a very small size, for delivery through a slow channel). The compression parameters can also be selected so that the clip delivery time is a constant independent of the actual link transfer rate.

Technical Description of a Preferred Embodiment for a Cellular Phone Accessory Unit

Electrical Schematics

FIGS. **6**A–D illustrate the electrical schematics of a mobile phone accessory unit. (The image of the printed circuit board, as rendered by Computer Aid Design Software is shown in FIG. **7**). Initial boot-up of the processor is done from the EEPROM (Electrically Erasable Programmable Read Only Memory) using passive serial SPI (Serial Programming Interface) protocol. Thereafter, the boot loader code, read from the EEPROM, loads the main firmware from the Flash memory. The PLL (Phase Locked Loop) of the processor is programmed for 5×multiplication of clock frequency.

Firmware debugging is carried out through the JTAG (Joint Test Action Group) port using standard TI (Texas Instruments) software. External RAM is mapped both to the program and data space at the same addresses and occupies all lower address space (64 k). Flash memory (Serial Data Flash) is accessed using software emulation of SPI protocol.

Audio code (Coder-decoder) works at approx. 22 kHz sampling rate (both channels). The Mode Control transistor selects the phone interface mode: either RS-232 control mode (closed state) or "hands free" mode (opened state). The phone itself does not support simultaneous usage of these two modes.

Both channels of RS-232 work at 11,5200 baud rate. From the PC side CTS (Clear to Send) and DTR (Data Terminal Ready) signals are supported. From the phone side CTS and RTS (Request to Send) signals are supported, with inverted polarities. Both channels employ hardware flow control.

The analogue signal level at the phone input is about 100 mV RMS (Root Mean Square). The level at the phone output is about 600 mV RMS.

Cellular Phone with Accessory Unit

A cellular phone **900** with an accessory unit **902**, according to one embodiment, is shown in FIGS. **8** and **9** using the Ericsson R520 as an example. The accessory unit is housed in thin cover **904** (see FIGS. **10** and **11**) providing a mounting body **906** for attaching the phone **900** to the unit, via an interface connector **800**. The accessory unit contains the printed circuit board **802** and speaker, preferably along the thin portion of the body.

The accessory unit is attached to the back of the phone using the phone connector **800**. A snap mounting which utilizes a dimpled section on the phone case typically intended for a car phone holder may also be used.

The accessory unit includes the server software and two voice modems, attached to the server. The mounting body contains all necessary electronic components.

The tasks of the electronic components include playing back of a pre-loaded sound clip upon a caller ID notification reception and downloading new clips from the server.

The body of the accessory unit preferably comprises a base **804**, a thin cover **806**, and a molded cover **808**. All three body components are preferably made of high-quality aluminum-magnesium-copper alloy (duralumin) and are chemically covered with a protective oxide film using two different dyes (colored and black) for the two copies of the device. A dense rubber casing may also be used. Factors considered in selecting the body material include lightness (so that the accessory unit would not exceed the phone itself in weight), mechanical strength, and the quality of electromagnetic shielding properties for protecting the internal components from the waves radiated by the phone.

According to one embodiment, the accessory unit that embodies the delivery system for a cellular phone attachment is about 1.5"×1.5"×0.25" and includes a small high fidelity built-in speaker. The accessory unit may connect into the AC adapter fixture in the bottom of a cellular phone. A dense rubber casing or glove may house the device to protect it. The inside of the rubber glove may have a molded cavity that the device will fit into. The glove may have a circle of small holes which line up with the device's speaker to allow full sound penetration. The device and glove may be sold in different design variations both for marketing purposes and for fitting the different cellular phones on the market.

Additionally, the accessory unit may connect into a cable connector instead of an AC adapter jack so that different jacks can be used. The device may also be modified with four or five variations to fit the various cellular phone software systems, (not AC adapter variations) currently on the market. The device, including a speaker, may also be made with several different adapter applications that would attach to a variety of different phones.

A snap-on mount for fastening the accessory unit to the phone may be located in the base body. The main purpose of the thin cover is to provide the electromagnetic shielding. The molded cover **808** contains connectors and some other components.

A simple snap mechanism for attaching the accessory unit to the phone, similar to the installation of a cellular phone to a car phone holder, may be provided.

FIG. **20** shows the accessory unit by itself, detached from the phone. The accessory unit can be detached from the phone similar to the detachment of other accessories such as the phone charger (usually by applying a rotating force rather than pulling straight out).

FIG. **21** shows the accessory unit uncovered. It is preferable to leave the body of the accessory unit closed. Preferably, there are no glued, soldered, or other permanent junctions inside, however, the high precision in the manufacture of some components could lead to their degradation after repeated assembly and disassembly.

The accessory-to-phone mounting is preferably designed to withstand repeated attachment and detachment without degradation of the snap-on mounting or connector. Although the phone body is also durable, it is preferable to attach and detach the accessory by shifting the snap-on lock upward manually during the attachment procedure (like to during detachment) to reduce wear of phone body near the latch.

The PCB (printed circuit board), located inside the accessory unit, is a multi-layer board which may have 0.2 mm gaps, two solder mask layers, and a silkscreen layer. The board preferably carries all the components, as illustrated in the schematics, excluding connectors and the speaker. Two outer layers of the board are signal layers; two internal layers are ground and 3.3V power plane. For convenience of the PCB assembly on modem plants, most packages are surface-mounted but not BGA. The board preferably does not contain any components requiring rare or custom-made equipment for their assembly.

The phone connector is preferably selected to maximize the firmness of the attachment, taking into account significant dimensions of the accessory unit. It should be mentioned that the connectors are unique to the type of the phone used (Ericsson R520 and compatible, like R320 and T28, in this example).

Factors in selection of the speaker for music playback included sound quality, which is primarily related to the speaker size, compactness, and weight of the speaker, as it is desirable that the speaker not be thicker and heavier than the phone itself. Depending on the available technology, there may be some tradeoff between good speaker quality and having a lightweight speaker. Speakers used in professional radio receivers-scanners may be a reasonable compromise since such speakers provide better than usual sound quality while possessing reasonable dimensions and weight. Other options include either sacrificing weight and dimensions to increase sound quality or using the new so-called "ceramic" speakers that are now appearing on the market. Mention should be made that although using these speakers could provide better quality, special modifications to the device would be required since these speakers could not be directly substituted in place of the standard ones.

It should also be noted that the bandwidth of the acoustic channel of the cellular phone which, in turn, is non-linearly compressed and transmitted over a digital channel of the phone, is much less than the bandwidth of the conventional landline phone and can deliver about 150 bytes per seconds data transfer rate. Conventional landline phone could deliver about 3700 bytes per seconds (V.34). Using better speakers in the phone would entail loading sound fragments of better quality (and, therefore, of bigger size), which would increase the time necessary to download a melody. The problem could be solved by using the GSM digital data channel directly which would provide a rate of about 1000 bytes per second for existing cellular networks and more than 7000 bytes per second for newly deployed systems. Alternative solutions include: having to tolerate an increase in the sound file or sound clip download time, downloading a melody from a local computer (the melody being delivered to the local computer by some alternate means), and redesigning the system to support conventional (landline) phones. In the latter case, due to the significant increase in the device body size, it may make more sense to use a stereo-effect (which is reasonable when the speakers of left and right channels have enough spatial separation).

Server Software Description

The server described herein performs the following functions: 1) startup, detection of the modem, detection of the melodies available; 2) answering incoming calls; and 3) servicing requests of user via DTMF codes.

Upon startup, the application requests the user to select which device to work with. Possible options include local test mode (**0**), modem on COM1 port (**1**), and modem on COM2 port (**2**).

If the local test mode is selected, all sounds will be played back using the sound card of the local computer and the computer keyboard will be used to control the server (via numeric buttons instead of DTMF keyboard). This mode is primarily for system testing purposes.

If one of the modems is selected, all sounds will be played back into the phone line using the selected modem, and the calling party's phone keyboard (DTMF tones) will be used to control the server. This is the normal mode of server operation.

The answering of incoming calls is performed differently in the local and the normal modes. In the local mode, the application waits for the 'R' key to be pressed to simulate remote party RING, while in the normal mode, the application waits for the RING signal from the modem. Then, in either mode, the application initializes the device used (sound card or modem). In the latter case, the modem goes "off-hook" and plays back the greeting message and the main menu (e.g., 0-End of the session, 1-Current, 3-Next, 4-Load).

Thereafter, the application goes into calling party servicing loop. Exit from the loop is possible upon reception of DTMF code '0' (or its simulation using the keyboard) or after the 30-seconds timeout if no reaction is detected from the remote user. Additionally, if working with the modem, the loop is exited when short beeps ("BUSY") condition is detected on the phone line. In the local mode, the 'X' key also leads to the immediate exit of the application.

The calling party servicing algorithm may work as follows: the software keeps the internal counter or number of the current sound clip. Initially, this number is "0" indicating that the clip is at the top of the list. Upon receiving the "1" command, the software plays back the clip with the current

number. Upon receiving the "2" command, the software increases the number and plays back the melody, i.e., plays the next melody. Upon receiving the "3" command, the software decreases the number and plays back the melody, i.e., plays the previous melody. Upon receiving the "4" command, the melody download is simulated. For the obvious reason, this mode is not implemented yet. Upon receiving the "0" command, the application switches the modem "on-hook" releasing the phone line and returns to the incoming call waiting state. Upon encountering any other command, the application plays back a standard error message. At any moment, the server application can be aborted by pressing <Ctrl>C combination on the keyboard.

The server application keeps a log file (e.g., named "ProgramName_N.Log") where N is a port number. Therefore, if two instances of the application are started, one for the modem on COM1 and the other for the modem on COM2, two independent log files will be created. The log file contains brief information about user and server actions, times of events, their main features, for example, state of the modem or the sound card. These files are intended to be sent to the software developers in case of problems but can be used for other purposes as well, for example, to estimate the server load.

Due to the fact that the server application always plays a melody with the same quality as one would be able to hear through the conventional phone channel [monophonic, 8 kHz-sampling rate (signal bandwidth up to 3.7 kHz)], the sound quality of the played back clips may be low. This is not related in any way with the quality of sound that would be digitally transferred to the client's phone when the melody is selected since listening to the clips from server through the phone network could not deliver better quality than the phone channel itself. For this reason, sound files compressed in monophonic versus stereo form would be preferred since the rate of delivery would be faster, with no loss in playback quality from the phone. At the same time, when the clips are downloaded into the phone in digital form, significantly better quality could be delivered upon playback due to the perceptual compression; however, this would increase the transfer time.

The server software could also be implemented to track which clips were sent to which user or subscriber. This information could then be tracked and reported to different third parties such as the Copyright Office, or performing or artists rights organizations or societies.

Devices for Accessing Sound and Image Files

Electronic devices adapted to receive sound and image data, according to the present invention, may be provided with an attachment or built in mechanism for providing consumers with Internet based or Internet free access to a library of downloadable sound and/or image files. Consumers may be allowed to download free clips of a song, musical composition, or other sound recording or movie or other performance onto any of these devices for use as alerts.

After hearing or viewing a clip, the user, preferably by the push of a button, may transact a purchase of the full file associated with the clip, which may be downloaded to the device in its entirety, or delivered to the user's address on an independent medium such as records, cassette tapes, CDs, videotapes, and DVDs. Such practice is intended to encourage the sales of sound and image files by giving the user the opportunity to quickly make an impulse purchase.

A device for downloading and listening to music files, which is similar to a walkman type I-pod™ device, but uses the same delivery method as described for the cellular phone comprises a speaker and/or an earphone set for listening to music with volume controls (such as Bose or Shure E5 universal earphones), and a server access element (which may be approximately the size of a credit card). Such a device may be used as a hand held portable music player, as well as a car radio or home system, and may include larger speakers for use as an audio system by businesses such as bars, restaurants and clubs.

In addition to features which allow a user to access the server library, the device may include other features common to conventional MP3 players and/or Apple I-Pod™ devices. The server access element includes controls, which may be buttons, for accessing, browsing, and downloading files from the server to the device. Speed dial technology may be used for accessing the server. For browsing, a multi-task arrows button which allows the user to browse, listen to samples, and highlight specific selections may be provided.

The server access element may include a small LCD monitor (approximately 1"×1.75") for text browsing the server library. A small microphone hole may also be included for allowing the user to browse the library using voice commands. The earphone set or speaker will enable the user listen to downloaded sound files.

Downloaded files may be stored on a device storage list for accessing at all times, or deleted. Thus, the user may access a library containing a large number of sound files, and browse, download, and listen to music, without the Internet or the need to plug into a computer. The consumer may be charged a fee for each download, or may be able to purchase actual items, for delivery to an address indicated by the user, such as records, cassette tapes and CD's through the access element. Free clips which the user can download may induce the consumer into purchasing the entire sound file from where the clip originated.

The device may also include a mechanism for allowing a user to store downloaded files on a medium, such as a card, independent of the device. To this end, the device may provide a slot into which a storage card may be inserted, such that when the device is full, files may be downloaded onto the card for emptying space on the device. A security mechanism may also be included to prevent intellectual property abuse, for example, by preventing users from playing copied files on other devices as described above. Such devices may further include a monitoring feature, which would allow performing rights organizations such as ASCAP and BMI to keep track of music publicly played by business such as bars, restaurants, and clubs for the purpose of paying out royalties.

A schematic diagram for a media file monitoring system **1800**, according to a preferred embodiment, is shown in FIG. **18**, for use with an I-Pod™ type listening device **1802**, wherein a consumer may purchase copyright registered media files which are downloaded wirelessly to the device **1802**. The system **1800** includes an existing wireless network **1804** of 1.5G or more, a system monitoring server **1806**, and a system content server **1808**. The monitoring server **1806** monitors and counts every file delivered to the consumer device **1802**, for monitoring and counting every file delivered to the device **1802**. The server **1806** may track each individually titled file which may include information such as song title and artist name, purchase price, the consumer's name, and other identity information, time of delivery, and any other pertinent information. The server **1806** may also protect encrypted copyrighted files from illegal file copying. The content server **1808** stores copyrighted digital media content licensed from multiple entertainment companies. Thereafter, monitoring information, including statistics may be transmit-

ted (e.g. through the Internet) to a company or organization. The system described may also apply to a viewer device for monitoring image files.

A portable laptop type viewer device, for accessing and viewing image and/or sound files, may comprise a wireless earphone set and/or speaker for listening to programs with volume controls, and a Personal Digital Assistant (PDA) with a monitor which may be approximately the size of a laptop computer. This device allows the user to access a server library containing a large number of movies, TV shows, cartoons, and other files, using either text or voice activation, without the need to plug into a computer or use of the Internet or other computer based wireless telecommunication system.

The files may be categorized and subcategorized by type of file (i.e. movies, TV shows) then by title or name of main actors. TV shows may further be classified by providing a description for each episode, similar to a description provided in a TV Guide™. Other categories and subcategories of classification may be provided to allow the user to identify the exact file he wishes to access.

The device allows the user to browse, download, preview, store and view his selections, (using text, voice, or button commands), wherein a fee may be charged by the provider for any or all of these options. The files may be made available as clips as well as in their entirety. The viewer device may include a folder containing previously downloaded image files that can be accessed at any time and deleted when desired. The library may be organized by categories such as type of show (i.e. movies, TV sitcoms), names of actors, show titles, sitcom description (e.g. as appearing in TV Guide™) etc.

Method of Advertising using Delivery of Sound Clips

The method of delivering sound and image files, in accordance with the present invention, can further be utilized as an advertising tool. To this end, any of the above-described systems carrying the library of sound and/or image files, which include a website and non-Internet accessible holding unit, may be used to expose the user to sponsored advertising messages. For example, a user calling the holding unit may hear advertising while the system is accessing the library.

Other advertising opportunities may be provided by utilizing a phone or other electronic device using alerts according to the present invention. For example, the phone may ring with advertising gimmicks such as promotional messages. Such advertisement gimmicks may be played as default rings when no clip is selected for the ring. Additionally, a phone may be programmed to play, or transmit advertisements spontaneously. Clips containing advertising messages such as jingles may also be provided. Advertising messages may be tacked onto a user selected clip of a popular song or the like.

Method of Distributing Music and Audiovisual Works to Consumers

A method of distributing music and audiovisual works to consumers while accounting to copyright owners of the works comprises: (a) Making available on a website various selections of works in various categories for review by identifying information and offering a portion of the work for hearing or listening, each work being coded internally with identification to a copyright owner or its representative; (b) Allowing consumers to select the viewable or listenable portion of the work for data storage online or for downloading to the consumers' electronic devices at home wherein the downloaded file being encrypted to only play on the consumer's electronic devices first receiving the download; (c) Optionally tracking those consumers who received the download of the portion of the work and reporting to the copyright owners or their representatives information concerning the download; (d) Allowing a consumer to return to the website to purchase and download a complete copy of the copyrighted work previously sampled by the consumer; (e) Conducting an online purchasing transaction and charging the consumer for the download; (f) Downloading a complete copy of the copyrighted work to the consumer in an encrypted fashion so as to be playable only in the consumer's electronic device and not exchangeable with third parties; (g) Tracking those consumers who received the download of the copyrighted work and reporting to the copyright owner of their representatives information concerning the download; and (h) Paying the copyright owners or their representatives a portion of the money received from the consumers for their downloading of the copyrighted work.

The delivery system, according to the present invention will also integrate with future wireless technology, such as 3-G systems, as it becomes available, for offering enhanced capabilities for accessing, delivering, and using sound and image files.

While the present invention has been described with reference to a preferred embodiment or to particular embodiments, it will be understood that various changes and additional variations may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention or the inventive concept thereof. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to particular embodiments disclosed herein for carrying it out, but that the invention includes all embodiments falling within the scope of the appended claims.

INDUSTRIAL APPLICABILITY

It is an object of the present invention to provide a unique method for using sound and image clips as alert sounds for a variety of electronic devices.

It is a further object of the present invention to provide a method for ringing a cellular telephone using actual sound files including sound clips which may comprise real music with human voice, various instrument sounds and other sound effects.

It is a further object of the present invention to provide a software system which may be integrated into existing cellular telephone hardware for enabling the cellular telephone to access and utilize sound files including clips, without the need for extra hardware.

It is a further object of the present invention to provide an accessory attachment for cellular telephones and for landline telephones which will enable the telephone to access and utilize sound files, including clips.

It is a further object of the present invention to provide a security feature for devices capable of receiving and playing multi-media files for preventing consumer unauthorized dissemination of such files.

It is a further object of the present invention to provide a tracking feature for devices capable of receiving and playing music files for providing performers and writers rights organizations with an accurate method of determining royalty right payments to registered performers and writers.

It is a further object of the present invention to develop a website for browsing and for delivery of sound and image files including clips.

It is a further object of the present invention to provide a method for selling and buying products associated with existing copyrighted music, movies, TV shows, and other recorded performances.

It is a further object of the present invention to provide a delivery method for allowing a user to access, browse and download files that is independent of the Internet, and does not require a plug in or hand wired connection.

These and other objects, advantages, and the industrial utility of the present invention will be apparent from a review of the accompanying specification and drawings.

What is claimed is:

1. A method of wirelessly delivering over the air one or more digital audio and/or visual files from one or more servers to one or more wireless device means comprising:

compressing said one or more digital audio and/or visual files, wherein said audio and/or visual files comprise one or more full or partial master recordings of songs, musical scores or musical compositions, videos or video segments, movies or movie segments, film or flu segments, one or more image clips, television shows, human voice, personal recordings, cartoons, film animation, audio and/or visual advertising content and combinations thereof, and wherein said compressing comprises normalizing, sampling and compressing said digital audio and/or visual files;

storing compressed audio and/or visual files in one or more storage mediums; and

transmitting to said wireless device means said compressed audio and/or visual files wirelessly over the air, with or without an Internet network.

2. The method of claim **1** further comprising providing selection of the delivery of one or more and compressed digital audio files and/or visual files for playback on said device means.

3. The method of claim **2** further comprising playing back of one or more of said selected compressed digital audio files and/or visual files.

4. The method of claim **2** wherein said compressed digital audio and/or visual file may be selected and/or received from the wireless device means on a voice mode connection without switching to data mode.

5. The method of claim **2** wherein said compressed digital audio and/or visual file may be selected for delivery from said wireless device means for play thereon without using an Internet connection.

6. The method of claim **5** wherein said compressed digital audio and/or visual file may be selected and/or received from the wireless device means on a voice mode connection without switching to data mode.

7. The method of claim **6** wherein said compressed digital audio and/or visual file is delivered to the wireless device means using a transmission protocol that maps digits to sounds.

8. The method of claim **1** further comprising providing said compressed digital audio files and/or visual file as an alert message or ringtone for the device means effective to signify the occurrence of a specific event.

9. The method of claim **8** wherein said wireless device means is a cell phone, and wherein said compressed digital audio and/or visual file is played as an alert or ringtone of an incoming telephone call.

10. The method of claim **9** wherein a segment of a compressed digital audio and/or visual file is played as an alert or ringtone of an incoming call.

11. The method of claim **10** wherein said segment is played a plurality of times as an alert or ringtone of an incoming call.

12. The method of claim **9** wherein said alert or ringtone is associated with a specific caller's telephone number, and is played upon said specific caller said cell phone associating specific number and specifically selected ringtone to identify incoming caller.

13. The met od of claim **12** wherein a plurality of compressed digital audio files and/or visual files are delivered and stored on said cell phone, and wherein a specific audio file and/or visual file of said plurality of files is associated with a specific caller calling said cell phone and is effective to play when said specific caller calls.

14. The method of claim **9** further comprising said cell phone being shared by a plurality of cell phone users, wherein a plurality of compressed digital audio files and/or visual files are delivered to and stored on said cell phone, and wherein a specific audio file and/or visual file of said plurality of files is associated with a specific user of said plurality of users, and wherein said file is effective to alert a user of said cell phone to an incoming telephone call wherein said specific user is the intended recipient of said incoming call.

15. The method of claim **1** wherein a plurality of compressed digital audio files and/or visual files are delivered to and stored on the wireless device means.

16. The method of claim **1** wherein said compression is MP3.

17. The method of claim **1** wherein said compressed digital audio and/or visual is delivered through the Internet or other computer based system.

18. The met d of claim **1** wherein said compressed digital audio and/or visual file is delivered to said wireless device means independent of an Internet connection or other computer based system.

19. The method of claim **1** wherein said compressed digital audio and/or visual file is a personal recording or video.

20. The method of claim **1** further comprising charging a fee based on the number of compressed digital audio and/or visual files delivered to said wireless device means for playback thereon or the duration of playback of said compressed digital audio and/or visual files.

21. The method of claim **1** wherein the compressed digital audio and/or visual file is a segment of a full song, musical composition or other audio recording or visual recordings.

22. The method of claim **1** comprising the use of OFDM.

23. The method of claim **1** comprising transmitting optimized and compressesd audio and/or visual files.

* * * * *

Proof of Service

I hereby certify that on August 9, 2016, the foregoing APPELLANT SKKY, INC.'S CORRECTED OPENING BRIEF was filed with the Clerk of Court for the United States Court of Appeals for the Federal Circuit using the appellate CM/ECF system which, pursuant to Federal Rule of Appellate Procedure 25(c)(2) and Federal Circuit Rule 25(e)(1), constitutes service on all parties represented by attorneys who have registered for the CM/ECF system. Participants in the case who are registered CM/ECF users will be served by the appellate CM/ECF system. A copy was also served on counsel of record for Defendants-Appellees via email at the following email addresses:

fmgasparo@venable.com
mswoodworth@venable.com

Dated: August 9, 2016

By: /s/ *Andrew J. Kabat*
Andrew J. Kabat
Counsel for Patent Owner-Appellant

FORM 19. Certificate of Compliance With Rule 32(a)

Form 19
Rev. 3/16

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

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